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A Report of Biological Data Developed in 1980 for the
Optimum Pest Management Trial, Panola and Pontotoc
Counties, Mississippi

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In cooperation with the Delta Branch of the Mississippi Agricultural
and Forestry Experiment Station, Stoneville, Mississippi.

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Summary

The third and final year of the Optimum Pest Management Trial (OPM) in Panola County, Mississippi, conducted concurrently with the Boll Weevil Eradication Trial in North Carolina and Virginia, was completed in 1980. The objectives were to develop data which will make possible evaluations of the biological, economic and environmental impacts of the two programs if they are used across the Cotton Belt.

As was done in 1979, 64 fields in Panola County and 32 fields in Pontotoc County were monitored for insect (pest and beneficial), spider mite, and spider populations. They were monitored weekly with 20 and 10 fields, those, also, monitored in 1977, being monitored semi-weekly in Panola and Pontotoc Counties, respectively. The fields monitored in Pontotoc County are used as index fields in a Current Insect Control (CIC) program for comparison with those of the OPM Trial in Panola County. Dynamic crop information such as weather, fruiting, missing fruiting forms, plant height, rooting depth and main stem nodes were recorded. Static crop information such as planting date, cultivar, rowspacing, soil types, peripheral ecosystems, insecticide applications and yields were recorded. All data taken were coded on special computer forms and were processed by the Mississippi State University Computer Center with special handling for data analyses accomplished at the Stoneville computer terminal.

Most growers in both counties planted systemic insecticide treated cottonseed and very few fields were treated with conventional insecticides for thrips control.

Cotton aphid, spider mite, cabbage looper, cotton fleahopper, beet armyworm, yellowstriped armyworm, fall armyworm, leafhopper, and bandedwing whitefly populations were generally light.

Boll weevil survival was higher than in the previous years because of milder weather during the winter of 1979-1980. As a result, boll weevils made a more rapid comeback than in previous years. Injurious infestations occurred in a few fields in Panola County and in most fields in Pontotoc County by mid season. Reduced boll weevil captures in infield traps in the spring in Panola County reflected efficacy of the fall diapause treatments in 1979. This also was reflected in lower field infestations in Panola County than in Pontotoc County. Reduced trap captures in Panola County in October over those in Pontotoc County reflected efficacy of the 1980 boll weevil fall diapause treatments.

Tarnished plant bug infestations were lower in both counties than in 1979 and were similar to those in 1977 and 1978. Populations of the clouded plant bug occurred in appreciable numbers for the third consecutive year and were much lower in 1980 than in 1979. However, it appears that growers may have to cope with the clouded plant bug problem in the future. The D-Vac sampling method gave higher population estimates than the drop cloth method. Population estimates were similar for the visual and sweep net methods.

Bollworm-tobacco budworm complex populations were moderate in both counties. Averages of 2.4 and 1.0 insecticide applications were made in Panola and Pontotoc Counties, respectively, comparing with 1.6 and 0.6 insecticide applications in 1979, and 1.9 and 0.9 insecticide applications in 1978, and 3.9 and 1.6 applications in 1977, respectively.

Predaceous insect populations were similar in both counties in 1978, 1979 and 1980. They were considerably lower than in 1977.

Populations of the hunting spider, Oxyopes salticus, were higher in Pontotoc County in July but were similar in the two counties, thereafter.

Introduction

The third year of the 3-year Optimum Pest Management Trial (OPM) in Panola County, Mississippi, conducted concurrently with the Boll Weevil Eradication Trial in North Carolina - Virginia was completed in 1980. The objectives were to develop data which will make possible evaluations of the biological, economic, and environmental impacts of the two programs if they are used across the Cotton Belt. Evaluations of the appropriate aspects of the Trials are the responsibility of the Biological, Economic, and Environmental Evaluation Teams. Their data will be made available to the Overall Evaluation Team which will make the final judgment on the best approach to deal with the boll weevil, Anthonomus grandis problem. ARS, now AR of SEA, was given the lead responsibility for developing data for the Biological Evaluation Team and for conducting research to improve existing, or to develop new techniques which might be used as population suppression components in the Trials. This is being done by a Research Team in each Trial area.

A prototype operation was conducted in 1977 in Panola and Pontotoc Counties to develop base line data, to evaluate and refine techniques and to develop procedures which would permit smooth expansion of the program when the OPM Trial got underway in 1978. Twenty and ten cotton fields were monitored for injurious and beneficial insects, spider mite and spider populations in Panola and Pontotoc Counties, respectively. The fields monitored in Pontotoc County represent Current Insect Control (CIC) procedures in contrast with the intensive pest management practices used in the OPM Trial in Panola County.

In 1978, the number of monitored fields was increased to 64 and 32 in Panola and Pontotoc Counties, respectively. They were monitored weekly with 20 and 10 of those also monitored in 1977, being monitored semi-weekly in Panola and Pontotoc Counties, respectively.

Results were given in a Special Report, "Development of Base Line Data in Panola and Pontotoc Counties, Mississippi in 1977 for the Optimum Pest Management Trial", in a "Report of Biological Data Developed in 1978", in a "Report of Biological Data Developed in 1979 for the Optimum Pest Management Trial, Panola and Pontotoc Counties, Mississippi", and in the following articles prepared for publication:

- Smith, J. W., W. P. Scott and C. R. Parencia. 1978. Predator-Prey Ratios for Control of Heliothis Species on Cotton. 1978 Beltwide Cotton Res. Conf. Proc. pp. 111-113.
- Scott, W. P., J. W. Smith and C. R. Parencia. 1980. Populations of the Tarnished Plant Bug, Bollworm and Tobacco Budworm in Selected Cotton Fields in Panola and Pontotoc Counties, Mississippi in 1977. U. S. Dept. of Agri., SEA, ARM-S-11.
- Lockley, T. C., J. W. Smith, W. P. Scott and C. R. Parencia. 1979. Population Fluctuations of Two Groups of Spiders From Selected Cotton Fields in Panola and Pontotoc Counties, Mississippi, S. W. Ent. 4: 20-24.
- Scott, W. P., J. W. Smith and C. R. Parencia, Comparison of Techniques for Sampling Populations of the Tarnished Plant Bug, Lygus lineolaris in Cottonfields in Panola and Pontotoc Counties, Mississippi, 1977-1978. Being revised for publication in Southwestern Entomologist.
- Parencia, C. R., Jr., W. P. Scott and J. W. Smith. 1980. Comparative Populations of Beneficial Arthropods and Heliothis spp. Larvae in Selected Cottonfields in Panola and Pontotoc Counties, Mississippi in 1977 and 1978. S. W. Entomologist 5:22-32.
- Smith, J. W., 1979, The Relationship of Beneficial Arthropod Populations to the Phenology of the Cotton Plant, 26th Annual Miss. Insect Control

Confer. Proceedings.

Scott, W. P., 1979. Comparison of Techniques for Sampling Population of the Tarnished Plant Bug, Lygus lineolaris, in Cotton Fields in Panola and Pontotoc Counties, Mississippi, 1977 and 1978, 26th Annual Miss. Insect Control Confer. Proceedings.

Lin, Y. N., J. W. Smith and D. W. Parvin, Jr., 1980. Preliminary Econometric Analysis of Cotton Yield and Optimum Pest Management in 1977 and 1978. AECM. R. No. 98, Miss. Ag. and For. Exp. Sta., pp 27.

Procedure

In 1980, as in 1978 and 1979, sixty-four and thirty-two fields were monitored in Panola and Pontotoc Counties for insect, spider mite and spider populations with twenty and ten fields being monitored twice weekly, respectively. In Panola County high percentages, 98.7% in 1978, 99.6% in 1979, and 99.7% in 1980, of the cotton acreage were included in the OPM Trial. The fields monitored in Pontotoc County in 1980, as in 1978 and 1979, represent Current Insect Control (CIC) procedure in contrast with the intensive pest management practices used in the OPM Trial in Panola County.

Dynamic Crop Information

Data were collected weekly beginning with the last week of May when plants were in the presquare stage of growth. Plants on fifty feet of row were examined in five locations in each field. The numbers of overwintering boll weevils, bollworms, (Heliothis zea), tobacco budworm, (H. virescens), eggs and larvae, tarnished plant bugs, (Lygus lineolaris), clouded plant bug, (Neurocolpus nubilus), cotton fleahopper, (Pseudatomoscelis seriatus), were recorded on a per acre basis. Thrips, (Franklinella spp.), populations were recorded in numbers per plant. Observations were made on cotton aphid, (Aphis gossypii), spider mites, (Tetranychus spp.), and whitefly, (Trialeurodes abutolonea) with infestations

recorded as none, light, medium or heavy.

The majority of the cotton fields in both counties were planted during the last week of April with planting completed by mid-May. Cool, dry weather from mid-May to mid-June slowed plant growth and development. Therefore, most monitored fields were not squaring until the first week of July. At this time, the numbers of boll weevils and punctured squares, numbers of bollworm - tobacco budworm larvae and numbers of damaged squares, and bolls were determined by examining 200 squares and 200 bolls (50 at 4 locations), and numbers of white blooms with those damaged being determined on 125 feet (25 ft at 5 locations) in each field. The row feet required for the inspections were recorded and the populations and damage were computed on a per acre basis. Numbers of bollworm - tobacco budworm eggs and larvae, plant bugs and cotton fleahoppers were determined on a per acre basis by examining plant terminals on 25 feet of row at five locations per field. Four 100 sweep net samples were taken and 6 feet of row in 5 locations were sampled with the drop cloth method for plant bugs and cotton fleahoppers in 20 and 10 intensively monitored fields in Panola and Pontotoc Counties, respectively. Populations were converted to a per acre basis. Information on the numbers of plants, squares, white blooms, bolls (by size), and missing fruiting forms on a per acre basis were collected weekly. Plant height, rooting depth and main stem nodes were recorded. All data taken were coded on special computer forms and were processed by the Mississippi State University Computer Center.

Beneficial arthropod populations were sampled with a D-Vac machine. A total of 40 row feet (4 samples of 10 row feet each) were sampled weekly in each field. All samples were placed in a freezer at the field operation base and were then brought to the laboratory at Stoneville where specimens were separated from trash by hand, identified and counted under magnification. Each identified species or group was coded on computer forms and the data were

processed by the MSU Computer Center with special handling for data analyses accomplished at the Stoneville computer terminal.

Static Crop Information

A large percentage of the cotton acreage was planted during the last week in April, with planting completed by mid-May. Very few fields had to be replanted. Fair to good stands of cotton were obtained in all fields although plant growth and development was slowed because of cool, dry weather from mid-May through mid-June. Approximately 40,000 and 8,000 acres were planted to cotton in Panola and Pontotoc Counties in 1980, respectively. Fifty-four of the 64 monitored fields in Panola County were planted on 38 inch rows, eight fields on 40 inch rows and two fields on 36 inch row. Thirty-five fields consisted of less than 25 acres and twenty-nine ranged from 25 to 100 acres. Ten acre increments were monitored in the larger fields. Plant populations were in the 20,000 to 30,000 per acre range in 13 fields, in the 30,000 to 40,000 range in 18 fields, in the 40,000 to 50,000 range in 21 fields, in the 50,000 to 60,000 range in 9 fields, and over 60,000 range in 3 fields.

In Pontotoc County, twenty-nine fields were planted on 38 inch rows and 3 were planted on 40 inch rows. Twenty-three fields consisted of less than 25 acres and nine fields of a little more than 25 acres. Plant populations were in the 20,000 to 30,000 range in 2 fields, in the 30,000 to 40,000 per acre range in 18 fields, in the 40,000 to 50,000 per acre range in 9 fields, in the 50,000 to 60,000 range in 3 fields, and in the above 60,000 range in 2 fields.

Seven cotton cultivars were included in the fields in Panola County. Nineteen were planted to Stoneville 213, twenty-nine to Stoneville 825, four to DPL-41, four to DPL-55, three to DES-056, two to DPL-61, and 3 to McNair 235. The soil types were Collins in 27 fields, Grenada in 6 fields, Loring in 9 fields, Falaya in 12 fields, Colloway in 5 fields, Memphis in 3 fields, Alligator silt loam in one field, and Alligator clay in one field.

Four cotton cultivars were included in the fields in Pontotoc County.

Thirteen were planted to Stoneville 213, nine to DPL-55, nine to Stoneville 825, and one to Coker 310. The soil types were Chewocla in one field, Mayhew in one field, Commerce in 2 fields, Frizzel in one field, Cascilla in two fields, Atwood in five fields, Falkner in three fields, Arkabutla in five fields, Adaton in three fields, Providence in two fields, Ora in one field, Bude in three fields, Urbo in two fields, and Falaya Silty clay loam in one field.

Table 1 lists in percentages makeup of the peripheral ecosystem of the monitored fields in Panola and Pontotoc Counties, Mississippi in 1979. The estimated percentages are based on aerial photographs of the 20 and 10 intensively monitored fields and the remainder on rough sketches of the fields.

Table 1. Makeup in percentages of the peripheral ecosystem of 96 fields
monitored in Panola and Pontotoc Counties, Miss., 1980.

Field No.	Soybeans	Cotton	Wood Margin	Pasture	Grasses or Hay	Corn	Woods	Brush
Panola County								
1	30		70					
2	10	75			10			5
3	10	30	40			20		
4	25	65	10					
5		50	30				20	
6	15		15				70	
7	10		40	15		35		
8	60	25	15					
9	10		25	25			40	
10	50	50						
11	5	25	20				50	
12	25	30	25	20				
13	60	10	30					
14	20	20	30				30	
15	10	70		20				
16	10	80						10
17	65		20		15			
18			75	25				
19	40	40	20					
20	30	40					30	
21	10	35	25	20			10	
22	25	60	15					
23	25	25	30	20				
24	40		25				30	5
25		30	10				60	
26	5	65	20	10				
27		50	15	15			20	
28	25	25	40		10			
29	60		20		10			10
30		30	30	40				
31	35	30			25			10
32	40	10	10		10		30	
33	30	40	15				5	10
34	30	60	10					
35	20	45	25				10	
36		70	15		15			
37	60	20	20					
38	45	50	5					
39	35	60			5	Rice		
40	85					15		

Table 1. Continued. Makeup in percentages of the peripheral ecosystem of 96 fields monitored in Panola and Pontotoc Counties, Miss., 1980.

Field No.	Soybeans	Cotton	Wood Margin	Pasture	Grasses or Hay	Corn	Woods	Brush
41		95	5					
42	65	30	5					
43		65	35					
44		55	5	25		15		
45		35	20	35				10
46	30	30	25				15	
47		60	30				10	
48	10	10	30				50	
49			25	65			10	
50	35	30	30					5
51	40	35	20					5
52	10	10	70					10
53		70	20			10		
54	55	35	10					
55	30		15	25	20		10	
56	35	45	20					
57	35		20			35		10
58	25	25	15	25	10			
59	35	45	20					
60		35	30		10	25		
61	40	40	20					
62	35	35	20				10	
63		85						15
64		60	30				10	
Pontotoc County								
1	30	15	15	10			30	
2	30		10	30	30			
3	75						25	
4	65	25	10					
5	30	55	15					
6		40	20	20	20			
7	30	10	40				20	
8	70			15	15			
9	25	55					20	
10	40	20	30				10	
11	45	35	20					
12	15	65		10		10		
13	25	30	10		20	15		
14	75	15			10			
15	50		10			40		
17	35	25	20				20	
18		35	15	15	15		20	
19	30		35			15	20	

Table 1. Continued. Makeup in percentages of the peripheral ecosystem of 96 fields monitored in Panola and Pontotoc Counties, Miss., 1980.

Field No.	Soybeans	Cotton	Wood Margin	Pasture	Grasses or Hay	Corn	Woods	Brush
20	50	25					25	
21	75						25	
22	50		25				25	
23	55	20	10				15	
24	80		20					
25	35	20	20	25				
26	15	15	10	25	15		15	
27	35	40	10				15	
28	55	25	20					
29	35	55	10			Sorghum		
30	10			35	10	10	35	
31	35	45	10				10	
32	20		5	25	50			
33			45	15	5		35	

Insecticide Applications

In Panola County, an average of 0.3 of an application of insecticide was applied to the 64 monitored fields for thrips control. An average of 0.3 of an application of insecticide was applied for control of plant bugs, an average of 2.4 applications were made for bollworm - tobacco budworms and an average of 0.1 applications for boll weevil control.

Methyl parathion at 0.5 pounds per acre was applied 4 times for boll weevil diapause control between September 10 and October 30 to all acreages (99.7%) of participating growers in the OPM Trial in Panola County. Each application spanned a period of 3-6 days. Applications were made under the direction of personnel of the Mississippi Cooperative Extension Service which is the operational agency for the OPM Trial.

In Pontotoc County the average number of insecticide applications made in the 32 monitored fields were 0.1 for thrips, 0 for plant bugs, 1.0 for bollworm - tobacco budworm and 1.2 for boll weevils.

Regular season insecticide applications were made by the growers. Foliar insecticides used for thrips and plant bug control were monocrotophos, dicrotophos, dimethoate and toxaphene. Those used for bollworm- tobacco budworm - boll weevil control were fenvalerate, fenvalerate + chlordimeform, methomyl, permethrin, fenvalerate + methyl parathion, fenvalerate + azinphosmethyl, fenvalerate + methomyl, EPN + methyl parathion, EPN + methyl parathion + methomyl, EPN + methyl parathion + chlordimeform, toxaphene + methyl parathion, methyl parathion + chlordimeform and monocrotophos, permethrin + azinphosmethyl, permethrin + methomyl + azinphosmethyl, permethrin + chlordimeform, permethrin + methyl parathion, permethrin + methomyl, permethrin + chlordimeform, permethrin + methyl parathion.

Weather

Rain gauges were installed at each monitored field site and rainfall was

recorded daily on work days. Air temperature, rainfall and evaporation were recorded at a location in Batesville but solar radiation recorded at Stoneville was used. Similar records for Pontotoc County were obtained from the Pontotoc Ridges Flatwoods Branch Experiment Station.

Rainfall in Panola County was 6.09 inches in May with cool temperatures. In June it was 2.40 and 1.46 inches in July with warm temperatures. Rainfall in showers over most of the month was 1.37 inches in August and 4.29 inches in September. However, temperatures were much warmer.

In Pontotoc County weather patterns were similar. Rainfall in May was 2.32 inches, 4.08 inches in June, 4.76 inches in July, 1.38 inches in August and 7.69 inches in September.

In both Counties, weather was not favorable for cotton production after mid-July. Most of the cotton crop was made in June and July. Extreme hot and dry conditions occurred in late July and August. Weather during most of the harvest period was favorable. Tables 2, 3, 4, 5, and 6 give the weather data for May, June, July, August and September in Panola County. Tables 7, 8, 9, 10 and 11 give the same information for Pontotoc County. Tables 12 and 13 give the rainfall for each field monitored in both Counties.

Table 2. Weather data for May. Panola County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	75	56	.44	.14	323
2	73	57	.02	.09	405
3	77	58	.08	.11	600
4	77	54		.23	601
5	79	56		.21	658
6	84	59	.02	.25	670
7	85	63	.05	.33	194
8	71	58	.09	.02	415
9	73	48		.25	726
10	74	50		.23	676
11	84	63		.39	545
12	86	69		.32	222
13	80	65	.13	.10	294
14	82	62	.03	.13	452
15	74	62	.81	.30	163
16	71	58	3.06	overflow	304
17	76	64	.02	.10	601
18	83	64		.25	652
19	85	69		.24	168
20	74	63	.04	.05	604
21	82	63		.20	266
22	78	64	.60	.10	391
23	74	60	.05	.12	556
24	79	63		.16	651
25	87	70		.26	496
26	92	66	.65	.29	662
27	84	66		.29	640
28	85	65		.27	588
29	89	71		.30	582
30	88	71		.38	562
31	89	71		.29	511
Total			6.09	6.40	
Average	80	62			490

Table 3. Weather data for June. Panola County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	88	67		.34	676
2	89	70		.40	676
3	90	73		.43	644
4	90	68		.29	542
5	93	69		.28	637
6	92	74		.37	697
7	95	73		.45	575
8	94	77	.01	.34	421
9	85	57		.34	473
10	80	50		.21	773
11	88	55		.29	679
12	88	52		.40	732
13	86	52		.32	728
14	91	58		.32	707
15	94	61		.49	718
16	95	73		.50	691
17	95	71		.37	547
18	88	70	.28	.28	649
19	87	71		.29	304
20	89	68	.38	.17	248
21	80	66		.08	548
22	88	66		.21	675
23	90	68		.31	490
24	90	65		.26	207
25	85	67	1.73	.33	563
26	89	72		.23	561
27	94	69		.29	709
28	92	71		.33	661
29	94	78		.35	572
30	91	69		.27	678
Total			2.40	9.54	
Average	91	71			593

Table 4. Weather data for July. Panola County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	97	72		.34	649
2	97	72		.30	685
3	97	77		.32	644
4	95	75		.41	705
5	94	72		.35	646
6	98	74		.35	658
7	98	74		.32	661
8	100	75		.35	686
9	99	74		.34	618
10	98	76		.33	702
11	100	75		.35	687
12	100	72		.35	692
13	101	71		.38	696
14	104	69		.37	689
15	102	68		.37	681
16	103	70		.36	684
17	104	67		.41	668
18	104	68		.34	679
19	102	66	.61	.45	689
20	97	67		.29	549
21	96	71	.16	.18	330
22	79	71	.11	.12	323
23	81	71	.32	.21	484
24	89	67	T	.21	652
25	90	64		.32	643
26	92	65		.26	612
27	93	69	T	.25	287
28	87	69	.26	.12	586
29	92	63		.24	673
30	93	63		.28	683
31	99	70		.31	634
Total			1.46	9.58	
Average	96	74			622

Table 5. Weather data for August. Panola County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	98	72		.34	509
2	95	72	.01	.25	663
3	94	74		.33	582
4	93	73	.29	.31	644
5	93	74		.36	618
6	95	72	T	.28	661
7	97	70		.27	570
8	100	70		.29	601
9	100	70		.29	601
10	99	69		.28	606
11	97	69		.20	439
12	96	71	.24	.19	591
13	99	70		.22	569
14	100	69		.26	587
15	95	71		.28	636
16	95	74		.33	623
17	94	73		.31	620
18	95	73		.31	636
19	95	71		.32	639
20	96	68		.32	648
21	97	69		.31	639
22	100	58		.28	654
23	92	57		.36	667
24	93	58		.33	558
25	97	64		.25	639
26	97	64		.28	497
27	97	63	.03	.22	521
28	95	62		.23	345
29	93	64	.13	.03	416
30	91	67	.67	.20	619
31	92	68		.28	599
Total			1.37	8.51	
Average	93	72			587

Table 6. Weather data for September. Panola County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	95	69	T	.29	594
2	96	70		.31	579
3	98	67		.33	576
4	96	66		.28	575
5	98	66		.30	504
6	99	67		.24	537
7	98	65	.02	.25	557
8	97	64		.22	445
9	99	63		.23	541
10	100	63		.22	552
11	93	55		.31	565
12	93	55		.26	541
13	98	52		.24	513
14	96	67		.24	520
15	99	59		.29	542
16	98	59		.29	473
17	100	62		.35	333
18	81	59	.08	.16	476
19	87	53		.21	548
20	93	55		.25	381
21	92	72	.08	.17	442
22	94	74		.20	502
23	94	70		.30	381
24	91	64	.10	.21	295
25	85	65	T	.09	175
26	75	60	.49	.08	408
27	75	56		.22	92
28	63	53	1.47	.06	96
29	66	60	.52	.08	79
30	73	52	1.53	.06	289
Total			4.29	6.74	
Average	89	67			437

Table 7. Weather data for May. Pontotoc County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	77	49		.17	580
2	69	55		.04	202
3	77	54		.13	436
4	80	49		.22	649
5	78	53		.15	454
6	81	51		.18	577
7	84	58		.25	704
8	79	55		.22	597
9	73	44		.16	679
10	72	44		.17	720
11	82	44		.33	722
12	83	66		.15	341
13	82	66		.14	657
14	81	65		.10	296
15	72	57	.02	.16	364
16	75	57	.25	.08	291
17	76	60	.48	.10	252
18	80	61	.02	.16	553
19	86	65		.25	711
20	75	61	.62	.18	219
21	81	56		.19	633
22	80	57	.46	.20	512
23	78	62	.47	.12	288
24	76	60		.14	538
25	84	65		.24	677
26	89	63		.20	578
27	88	56		.24	607
28	85	57		.22	689
29	89	63		.19	474
30	87	68		.20	563
31	84	67		.21	532
Total			2.32	5.59	
Average	80	57			522

Table 8. Weather data for June. Pontotoc County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	86	66		.22	518
2	88	63		.32	695
3	88	66		.27	672
4	90	67		.24	629
5	93	68		.25	693
6	93	69		.27	601
7	93	71		.28	580
8	92	71		.37	710
9	84	55		.24	504
10	80	51		.21	694
11	87	52		.23	775
12	88	52		.32	728
13	86	54		.27	747
14	91	59		.31	783
15	93	67		.35	754
16	93	65		.38	762
17	93	69	.57	.29	665
18	89	69	.41	.24	667
19	86	69	.33	.21	513
20	85	64	.19	.12	308
21	84	65		.11	404
22	86	66		.20	718
23	87	70		.23	739
24	87	66	2.13		703
25	82	67	.42	.15	547
26	90	69		.35	890
27	92	70		.28	938
28	92	74		.29	876
29	93	76		.33	925
30	87	68	.03	.13	374
Total			4.08	7.46	
Average	88	65			670

Table 9. Weather data for July. Pontotoc County, 1980.

Date	Air temperatre		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	95	71		.27	
2	97	75		.31	937
3	98	76		.30	749
4	94	73		.32	
5	94	73		.30	
6	96	74		.29	
7	98	76		.28	
8	99	76		.30	
9	99	77		.31	
10	98	74		.22	
11	99	76		.30	
12	100	76		.35	
13	101	83		.32	770
14	104	74		.32	748
15	104	75		.36	745
16	104	75		.33	737
17	104	73		.36	743
18	104	74	.19	.27	693
19	100	68		.26	607
20	98	70	.06	.33	723
21	94	73	.06	.30	664
22	78	72	.25	.04	146
23	85	72	.57	.12	298
24	88	68		.16	437
25	90	68		.24	695
26	92	68	3.08		538
27	91	70	.55	.23	566
28	86	70		.23	633
29	90	66		.20	601
30	91	68		.25	710
31	97	72		.25	732
Total			4.76	8.12	
Average	95	73			373

Table 10. Weather data for August. Pontotoc County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	98	71		.27	660
2	95	71	.43	.22	585
3	95	71		.26	671
4	91	70	.09	.15	433
5	91	72		.21	578
6	91	69		.18	511
7	95	72		.24	724
8	97	72		.26	683
9	98	72		.25	631
10	98	71		.19	570
11	95	70		.24	605
12	94	72		.25	627
13	97	71	.03	.26	635
14	99	71	.07	.30	608
15	95	72		.24	542
16	94	72		.26	695
17	95	73		.26	688
18	95	73	.03	.21	528
19	95	72		.26	682
20	97	73		.28	701
21	98	70		.25	678
22	102	64		.28	671
23	94	62		.26	729
24	93	66		.25	634
25	95	68		.24	583
26	97	70		.27	630
27	95	70		.32	617
28	93	68		.25	576
29	92	67	.73	.30	519
30	88	67		.21	588
31	92	68		.24	624
Total			1.38	7.62	
Average	95	70			619

Table 11. Weather data for September. Pontotoc County, 1980.

Date	Air temperature		Rain (inches)	Evaporation	Solar Radiation
	Maximum	Minimum			
1	93	72		.22	598
2	97	70		.26	626
3	98	66	.45	.21	513
4	91	67		.20	690
5	94	69		.22	657
6	95	71		.22	
7	95	68		.24	
8	97	66		.22	
9	98	67		.21	
10	99	67		.24	
11	96	60		.24	
12	92	61		.24	
13	96	69		.21	
14	97	70	.03	.19	503
15	100	68		.23	534
16	97	68		.26	622
17	100	64	.50	.33	504
18	82	61	.08	.11	422
19	85	61		.18	546
20	88	62		.17	531
21	91	73	.15	.16	416
22	91	74	.07	.18	440
23	94	77		.20	516
24	93	67		.21	515
25	82	67	.27	.09	271
26	74	60	.60	.06	108
27	80	69		.19	455
28	64	55	2.90		128
29	62	57	2.64		38
Total			7.69	5.49	
Average	90	66			

Field no.	May		June		July		August		September		Total							
	18-24	25-31	1-7	8-14	15-21	22-28	29-5	6-12	13-19	20-26		27-2	3-9	10-16	17-23	24-30	31-6	7-13
1	3.03				.05	2.15				.77	.15				.20	.02		1.00
2	3.60				.06	2.88				1.20	.10	.78						.65
3	2.16				.04	2.26				1.36	.15				.02		.03	.62
4	3.42				.40	3.00				1.69	.08	.01					.12	.90
5	4.07				.14	3.40				1.63					.10		.31	.50
6	2.81				.21	3.65				1.64	.12		.25				.68	.50
7	3.53				.10	4.13				1.25		.42					.40	.40
8	2.97				.11	4.50				1.30	.04	.12				.65	.86	.40
9	2.62				.10	3.78				1.80	.03					.05	.85	.53
10	2.20				.07	3.75				1.08	.32					.01	.73	.86
11	2.50				.32	2.88				1.28					.23		.50	.42
12	2.56				.22	3.40				1.58	.38				2.00		.50	.50
13	3.18				.14	3.15				1.43	1.00	.20	.50				.76	.67
14	3.15				.84	3.00				1.50	.05		.80				.16	.79
15	2.93				.50	2.37				1.52	.02		.02		.19		.30	1.15
16	2.76				.75	3.25				.95	.02	.43			.10		.35	.67
17	2.55				.75	4.05				1.35	.05				.30		.50	1.50
18	2.30				.81	2.80				.85	.45					.40		.67
19	2.25				.30	3.25				.73	.85					.04		8.41
20	2.80				.71	3.70				1.04	.45					.15	.31	.64
21	2.63				1.94	3.80				1.50	.60					.14	.66	8.64
22	2.25				1.75	3.50				.90	.50	.50					1.21	10.61
23	3.00				2.00	3.40				1.05	.90	1.79			2.55		.05	1.19
24	3.40				1.15	3.40				1.05	.25						.80	1.10
25	3.10				.76	3.25				1.40	.05				.16		.67	10.23
26	2.70				1.86	3.25				2.30	.05		.08			.61	.37	11.38
27	3.35				1.65	3.60				1.00	.50					.61	1.20	11.91
28	2.02				.76	3.80				.70	.80					.04	.36	8.48
29	2.20				1.13	4.65				1.20	.80					.50	.92	11.45
30	2.42				1.25	3.10				1.16	.70				.24		1.17	10.04
31	2.35				1.59	2.61				1.50	.10		.05		.19		.42	8.81
32	1.90				1.45	2.70				1.70	.35				.50	.32	.58	9.50
33	2.23				1.98	2.91				1.40	.36		.16				.59	9.76

Table 12. Continued: Weekly rain (inches) from mid-May through September in 64 monitored fields, Panola County, 1980.

Field no.	May			June			July			August			September			Total			
	18-24	25-31	1-7	8-14	15-21	22-28	29-5	6-12	13-19	20-26	27-2	3-9	10-16	17-23	24-30		31-6	7-13	14-20
34	2.54				1.68	3.17				1.52	.12		.83				.31	.63	10.80
35	2.70				2.01	3.45				1.58	.13		.58				.58	.63	11.65
36	2.27				1.40	3.11				1.20	.33		1.54				.61	.29	10.75
37	2.12				1.06	3.88				1.35	.65		1.09			.25		.28	10.68
38	1.36				.64	5.23				1.21	.69					.70		.30	10.13
39	1.83				.55	3.20				.93	.42					.34	.61	.28	8.16
40	1.77				.60	5.31				1.00	.01					.20		.10	9.66
41	2.96				1.14	4.77				1.05	.06						.67	.07	11.17
42	3.18				.85	4.63				.98	1.68		.02				1.12	.07	11.17
43	1.92				1.47	2.75				1.40	.07		.70				1.80	.38	13.52
44	2.37				1.68	3.12				1.57	.11		2.06				.50	.60	9.41
45	2.36				1.44	3.04				2.09	1.09		.76		.08		.22	.60	11.73
46	3.00				1.41	3.14				1.91	.15		.42				.10	.30	10.96
47	2.37				1.26	3.22				2.27	.40		.28		.07		.61	.30	10.94
48	3.00				1.20	3.30				2.24			.23		.03		.54	.22	10.81
49	3.00				.94	3.02				1.95	.12							.15	8.76
50	2.60				1.72	3.57				1.40	.42		.95			.50		.30	10.96
51	2.91				1.19	3.50				2.17	.09		.57			.40		.20	11.13
52	2.74				.85	4.00				1.72	.72		.35			1.00		.40	11.78
53	3.15				1.22	3.95				1.00	1.36					.50		.28	11.46
54	2.84				1.30	3.95				1.34	.50		1.75			.18		.42	10.11
55	2.45				1.95	3.53				1.58	.65		.35			.40		.23	12.73
56	2.91				1.33	3.51				2.03	.09							.09	10.45
57	2.01				1.99	3.16				1.32	.09				.18	.05		.19	8.99
58	2.52				1.00	5.53				2.88	.20						.10	.12	12.35
59	3.56				.87	5.08				1.75	.07					.04		.09	11.46
60	3.45				.93	4.57				2.05	.12					.09		.03	11.24
61	2.86				1.30	6.01				1.00	.09		.44		.64	.45		.09	11.80
62	2.50				1.44	8.00				2.30	.10		.08				.08	.07	15.57
63	3.51				1.37	7.21				2.30	.09							.05	14.60
64	2.44				1.53	8.00				2.78	.10		.31			.06		.08	15.30

Table 13. Weekly rain (inches) from mid-May through September in 32 monitored fields, Pontotoc County, 1980.

Field no.	May			June			July			August			September			Total			
	18-24	25-31	1-7	8-14	15-21	22-28	29-5	6-12	13-19	20-26	27-2	3-9	10-16	17-23	24-30		31-6	7-13	14-20
1	.69				3.06	1.15	1.04			1.41	1.34	1.22			.03		.04	.73	10.71
2	.47				2.75	1.22	.86			1.41	.80	.90			.05		.04	.41	8.91
3	.62				5.02	1.90	1.31			.80	2.00	2.07			.10				13.82
4	.57				5.94	1.90	1.03			.70	2.37	1.85			.29			.33	15.14
5	.60				.42	1.70	1.00				2.68	2.38						.22	9.00
6	.49				.31	1.72	1.06			.74	2.87	1.90					.12	.24	9.21
7	.47				5.42	1.12	1.01			.84	2.29	.91					.06	.24	12.36
8	.55				6.63	1.95	.85			1.32	3.25	.31			.13		.20	.30	15.19
9	.49				1.90	1.70	.04			.95	.31	.20			.62		.40	.42	7.49
10	.75				4.64	1.99	.85			.95	2.10	.85			.10		.04	.42	12.93
11	.53				3.40	2.12				1.21	1.72				.09		.33	.22	9.83
12	.65				2.68	2.00	.02			.71	.70	.54			.62	.43	.16	.22	9.77
13	.46				3.60	2.26	.27			.70	.12	.67			1.00	.18	.20	.05	8.93
14	.48				3.37	2.25	.10			.78	.12	.80			.82	.19		.21	10.00
15	.58				2.60	1.65				1.13		.35	.55		.23	.61		.27	7.97
17	1.78				.49	1.20	.64												4.11
18	1.50				1.35	2.42	.01			1.23	3.90	.44			.09			.53	12.44
19	1.25				1.30	3.24				.47	2.28	.80				.97		.69	13.13
20	1.78				1.49	1.80	.15			.47	2.55	.06				.75		.50	9.55
21	1.40				1.13	2.82	.01			.40	3.75	.23				1.26		.82	11.82
22	1.50				1.81	2.91				.38	2.92	.50				2.60		.64	13.26
23	1.65				3.54	3.64				.69	.80	.15			.34	1.05		.13	11.99
24	1.33				.65	3.86				1.17	2.09	.65			.44	1.05		.50	10.74
25	1.10				1.60	2.66				.76	1.31	.26	.07			.08	1.00	.33	9.17
26	.81				1.38	2.03				1.04	2.05	.21	.46			.12	.03	.55	8.68
27	1.10				1.75	1.68				1.28	.86	.13	.04			.35	.05		7.24
28	1.20				1.73	2.17				1.04	1.39	.12	.14			.07	.45	.91	8.31
29	1.29				2.76	2.63				1.24	.52	.29				1.03	.56	.65	11.23
30	1.25				2.06	2.30				1.01	1.20	.09			.51		.65	1.00	10.15
31	1.10				1.54	1.94				.62	2.11	.15			.91		.50	.93	10.32
32	1.20				1.25	1.85				1.03	1.42	.51			.20		.33	1.00	8.79
33	1.63				1.82	2.24				1.94	1.41	1.09			1.28		.50	1.09	13.65

Yield Information

The cotton crop matured earlier than normal because of drought. Harvest weather was good with some acreage being harvested in early September. Hot and dry conditions did not allow bolls that were set in late July and August to mature, so full yields in many fields were not realized. Yield records were taken from all fields monitored in Panola and Pontotoc Counties. Ten-10 foot row areas were hand picked in each field. Seed cotton was brought into the laboratory, weighed and later returned to the farmer. Green bolls were counted in each picked section and were converted to seed cotton. The average estimated yield was 1.2 and 0.9 bales per acre in Panola and Pontotoc Counties, respectively. Yields of lint per acre in various fields may be noted in Table 14.

Insect, Spider Mite and Spider Populations

Thrips.--Most growers in both counties planted systemic insecticide treated cotton seed. Thrips infestations were light with an average of 0.3 of a foliar insecticide application made in the 64 monitored fields in Panola County. The average in the 32 monitored fields in Pontotoc County was 0.1 of a foliar insecticide application.

Cotton aphid.--Owing to cool weather, cotton aphid populations were moderate early in the season. As the weather became more favorable predators and parasites reduced numbers and populations were insignificant for the rest of the season.

Spider mites.--Spider mite populations increased during the season due to the dry weather. Infestations were not sufficiently heavy to merit treatment in the monitored fields.

Bandedwing whitefly.--Whitefly populations were higher than in 1979 and were similar to those in 1977 and 1978.

Cabbage looper.--Infestations of this insect were insignificant throughout the season.

Cotton fleahopper.--Populations of this insect were lower than in 1979 and were well below treatment action levels.

Beet armyworm, Yellowstriped armyworm and Fall armyworm.--Infestations were insignificant throughout the season.

Leafhoppers.--Infestations of leafhopper, primarily Empoasca fabae with other genera such as Graphocephala, Graminella, Chlorotettix, Erythroneura, and Oncometopia represented were generally light.

Boll weevil.--Boll weevil populations in surface woods trash in December, 1979, averaged 161 and 2097 boll weevils per acre in Panola and Pontotoc Counties, respectively, indicating a reduction in the number of boll weevils that entered hibernation sites in Panola County resulting from treatment for diapause control. After a fairly mild winter, no weevils were found in Panola County at the same sites in March 1980. At the same time an average of 564 boll weevils per acre survived the winter in Pontotoc County. Trap captures in the spring of 1980 in Panola County show a 47 percent reduction in captures of boll weevils from 1979, and 93 percent below captures in Pontotoc County. Trap captures during the first weeks of fall trapping indicated a 81 percent reduction in Panola County compared with Pontotoc County.

Boll weevil populations came back earlier and in greater numbers in 1980 than in the three previous years. In the first week of July during peak of fruiting in Panola County 5 of 64 monitored fields were infested with an average infestation of 1 percent punctured squares and a range of 1 to 2 percent. One monitored field required treatment for boll weevil control before bollworm - budworm control was initiated. In Pontotoc County 26 of 32 intensively monitored fields were infested with an average of 5.4 percent punctured squares ranging from 1 to 27 percent. Many of the fields should have been on an insecticide program for the boll weevil. Average boll weevil captures per trap in the spring

and fall of 1980 in Panola and Pontotoc Counties are indicated in Figures 1 and 2.

Comparative boll weevil populations and punctured squares per acre in monitored fields in Panola and Pontotoc Counties in 1980 are given in Figures 3 and 4.

Results of fall collections of surface woods trash were not completed in time for inclusion in this report.

Plant bugs.--Tarnished plant bug infestations were lighter in both counties than in 1979. They peaked somewhat higher in Pontotoc County. An average of 0.3 of an insecticide application was made for their control in Panola County with none made in Pontotoc County. The need of more insecticide applications is debatable. Growers hesitated to treat for fear of killing off beneficial arthropods leaving the crop vulnerable for subsequent infestations of the bollworm complex. Such fears usually are justified. However, the feared adverse effects did not occur in most fields treated for plant bugs because of the moderate bollworm complex infestations.

Clouded plant bug populations were lower in both counties than in 1979 with somewhat higher populations occurring in Pontotoc County. Comparative tarnished and clouded plant bug populations in monitored fields in Panola and Pontotoc Counties may be noted in Figures 5 and 6.

Four techniques were compared for sampling plant bug populations during July in the two counties. Based on the 1980 data the D-Vac method appeared to be the most efficient in that it gave the highest population count. The drop cloth method was second with little difference between the visual and the sweep net methods. Comparative populations in Panola and Pontotoc County with the 4 sampling methods may be noted in Figure 7 and 8, respectively.

Bollworm and tobacco budworm.--Heliothis spp. populations were somewhat higher in 1980 in both counties than in 1979. They were somewhat lighter in

Pontotoc than in Panola County. An average of 2.4 insecticide applications were made for Heliothis spp. control in Panola County in 1980 compared with 1.6 in 1979, 1.9 in 1978 and 3.9 applications in 1977, respectively. An average of 1.0 insecticide applications were made in Pontotoc County in 1980 compared with 0.6 in 1979, 0.9 in 1978 and 1.6 applications in 1977.

Comparative Heliothis spp. populations in terminal buds in the two counties may be noted in Figure 9. Heliothis spp. larval populations in blooms, squares and bolls are given in Figure 10. The peak total larval population was slightly under 2,000 per acre early in August in Panola County. The peak in Pontotoc County was about 4,000 per acre in mid-August.

Seasonal comparative per acre Heliothis spp. larval populations in squares in the two counties are given in Figure 11. Seasonal per acre damaged squares may be noted in Figure 12. Square damage peaked at about 7000 in mid-August in Panola County and at about 3,500 per acre in Pontotoc County at the same time.

Figures 13 and 14 give the average Heliothis spp. larval populations in bolls and damaged bolls per acre in Panola and Pontotoc Counties, respectively. Boll damage peaked at less than about 2,000 per acre in Panola County and at slightly more than 12,000 in Pontotoc County, indicating that more treatments for control were needed in the latter county.

Seasonal per acre production of squares, blooms and bolls in Panola and Pontotoc Counties may be noted in figures 15 and 16, respectively.

Beneficial insects.--Populations in both counties were moderate and similar in 1978, 1979 and 1980. They were lower than in 1977 when populations were considered to be high. Comparative total beneficial insect populations in the two counties may be noted in Figure 17. Populations peaked slightly higher in Pontotoc County.

Comparative populations of important beneficial insects, the insidious

flower bug, the big eyed bug, the convergent lady beetle, the spotted lady beetle, the green lacewing, a nabid (Reduvialus reseipennis) and a lynx spider (Oxyopes salticus), in the two counties may be noted in Figure 18. Populations were similar in the two counties with populations peaking about a week later in Pontotoc County. Populations declined at a more moderate rate in August in Pontotoc County.

The most abundant insect predator species in both counties were the insidious flower bug, Orius insidiosus and the big eyed bug, Geocoris. Of the two species the big eyed bug was more abundant in 1977, 1978, and 1980. The flower bug was more abundant in 1979. The average O. insidiosus populations were considerably higher in Panola County until mid-July when they decreased appreciably. Lower populations held up on into August in Pontotoc County (Figure 19).

The average G. punctipes populations were higher in Panola than in Pontotoc County. (Figure 20).

Comparative populations of the spotted lady beetle may be noted in Figure 21. They were higher in Panola County than in Pontotoc County. Convergent lady beetle populations were higher in Pontotoc than in Panola County. (Figure 22).

Beneficial insect populations were similar in Panola County in 1978, 1979 and 1980. Therefore, it appears that the boll weevil diapause treatments in the fall of 1978 and 1979 had no adverse effects on populations in 1979 and 1980.

Spiders

Comparative spider populations of the hunting spider, Oxyopes salticus, may be noted in Figure 23. Populations were somewhat higher in Pontotoc County than in Panola County in July.

Table 14 - Yields in monitored fields in Panola and Pontotoc Counties, 1980.

Field No.	Pounds of Lint	Field No.	Pounds of Lint	Field No.	Pounds of Lint
Panola County			Pontotoc County		
1	703	33	672	1	416
2	745	34	PB0 <u>1</u> /260	2	282
3	757	35	536	3	359
4	385	36	637	4	363
5	400	37	575	5	356
6	646	38	PB0 <u>1</u> /400	6	351
7	456	39	675	7	479
8	546	40	PB0 <u>1</u> /275	8	539
9	503	41	407	9	216
10	477	42	775	10	545
11	420	43	803	11	669
12	462	44	624	12	467
13	524	45	853	13	518
14	377	46	985	14	639
15	436	47	618	15	456
16	458	48	503	17	455
17	495	49	670	18	348
18	244	50	890	19	570
19	PB0 <u>1</u> /575	51	803	20	463
20	763	52	PB0 <u>1</u> /500	21	414
21	PB0 <u>1</u> /510	53	617	22	140
22	607	54	925	23	411
23	732	55	651	24	352
24	836	56	1065	25	368
25	486	57	443	26	424
26	PB0 <u>1</u> /450	58	552	27	464
27	375	59	754	28	479
28	741	60	542	29	401
29	608	61	761	30	526
30	311	62	581	31	562
31	465	63	708	32	490
<u>32</u>	PB0 <u>1</u> /375	64	557	33	222
Average			586	Average 430	

PB0 - Picked by Owner, Yield estimate obtained from farmer.

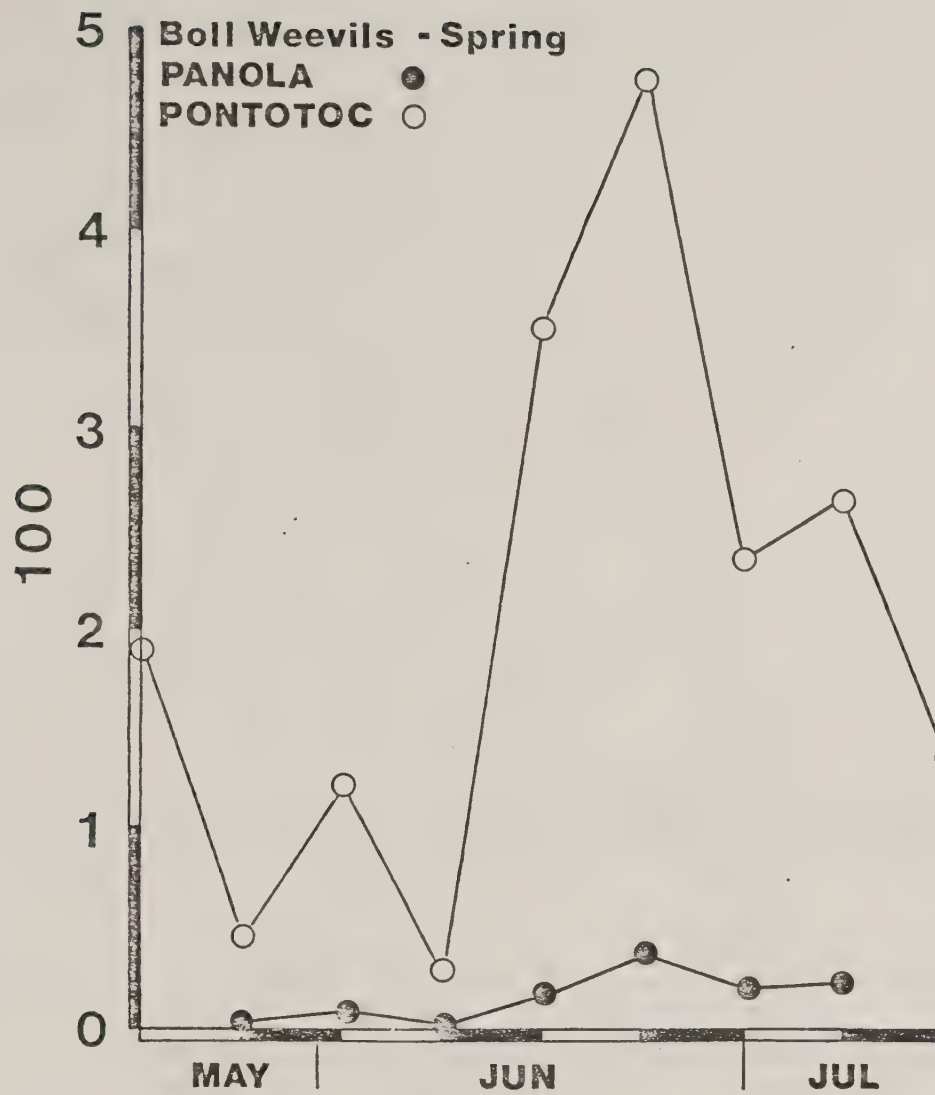


Fig. 1. Average Boll weevil captures per trap (infield) in Spring in Panola and Pontotoc Counties, 1980.

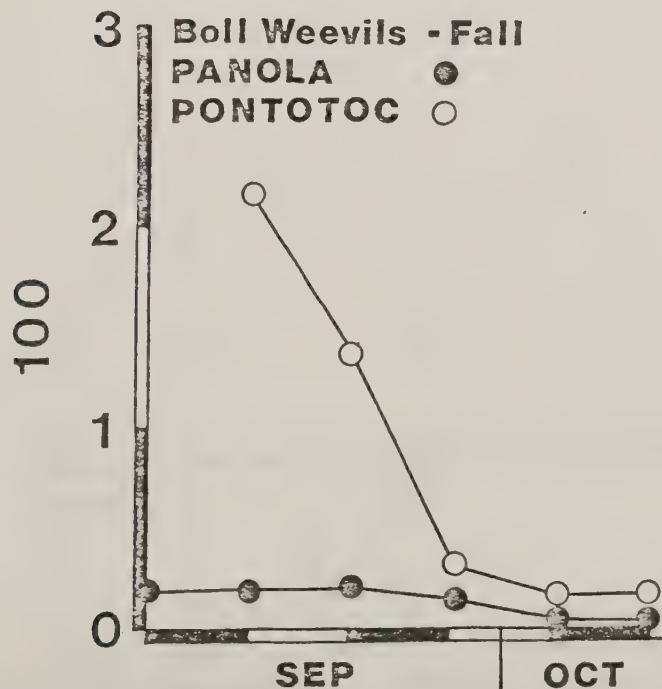


Fig. 2. Average Boll weevil captures per trap (infield) in the fall in Panola and Pontotoc Counties, 1980.

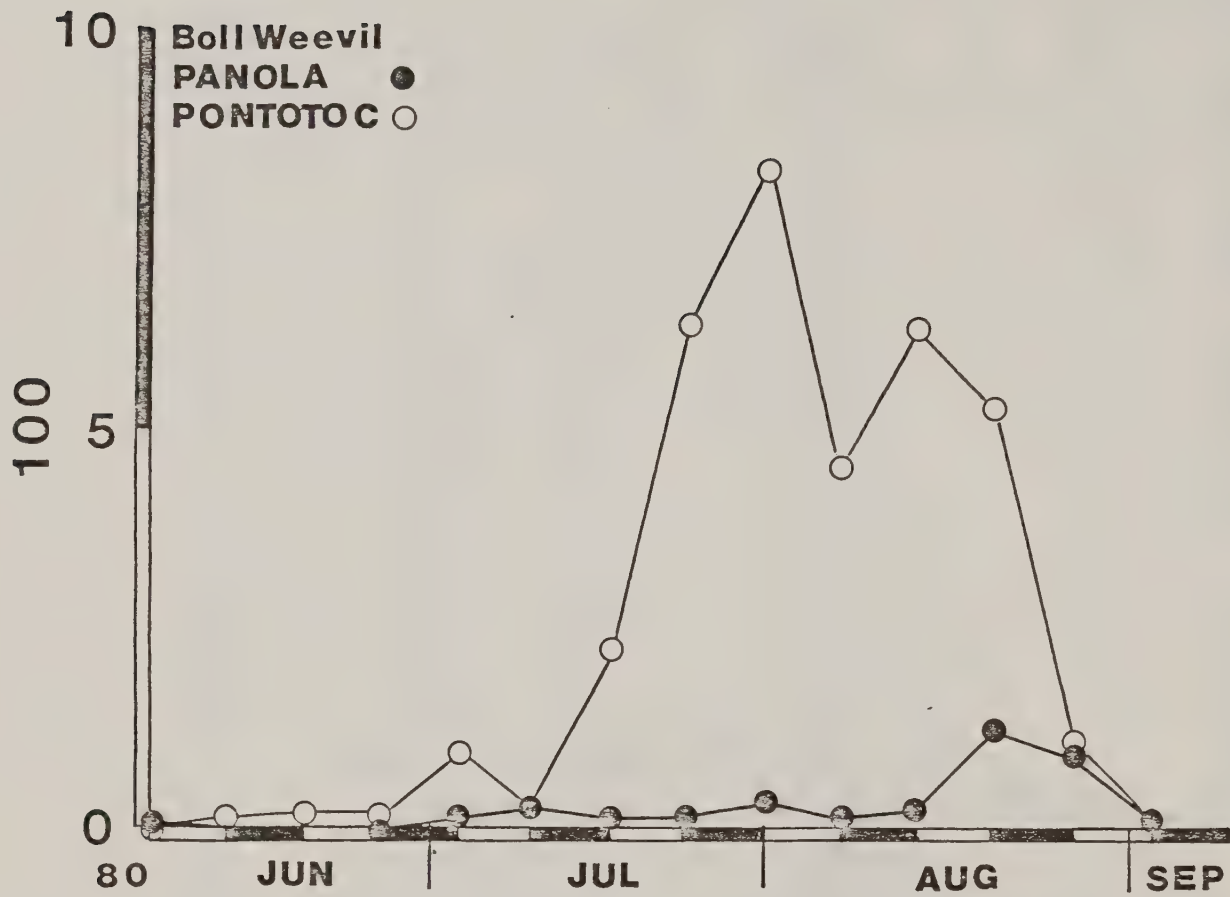


Fig. 3. Seasonal average per acre boll weevil populations in squares in Panola and Pontotoc Counties, 1980.

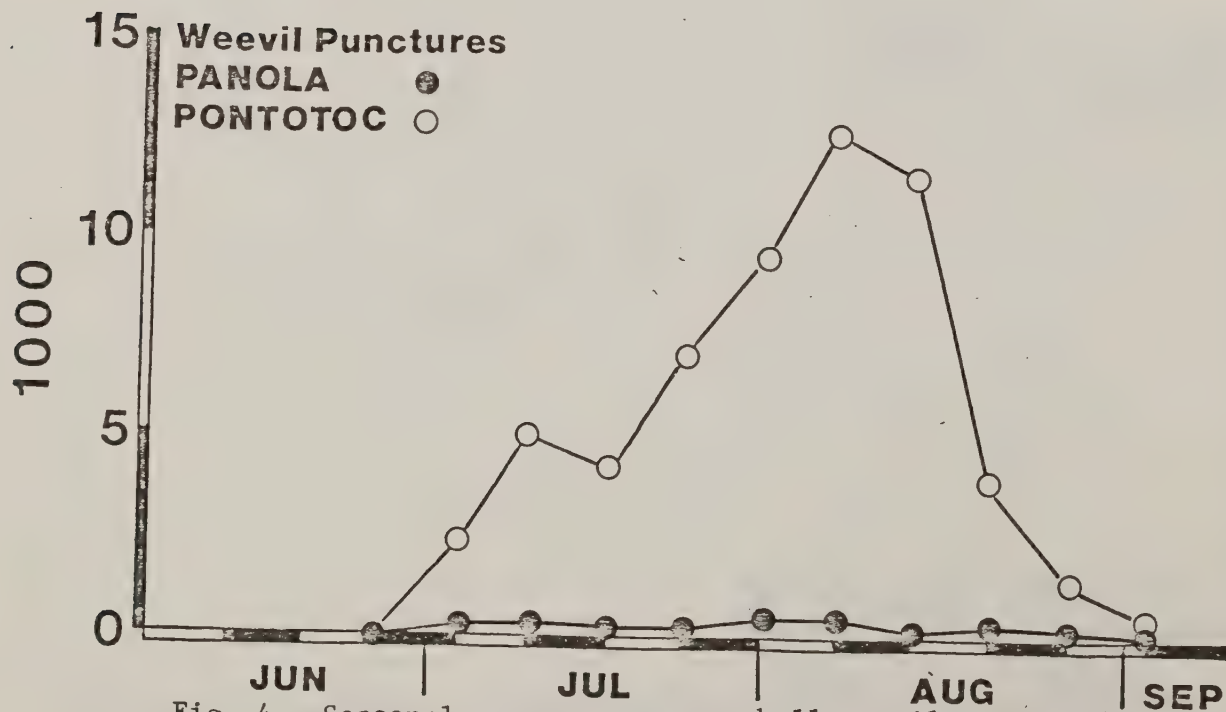


Fig. 4. Seasonal average per acre boll weevil punctured squares in Panola and Pontotoc Counties, 1980.

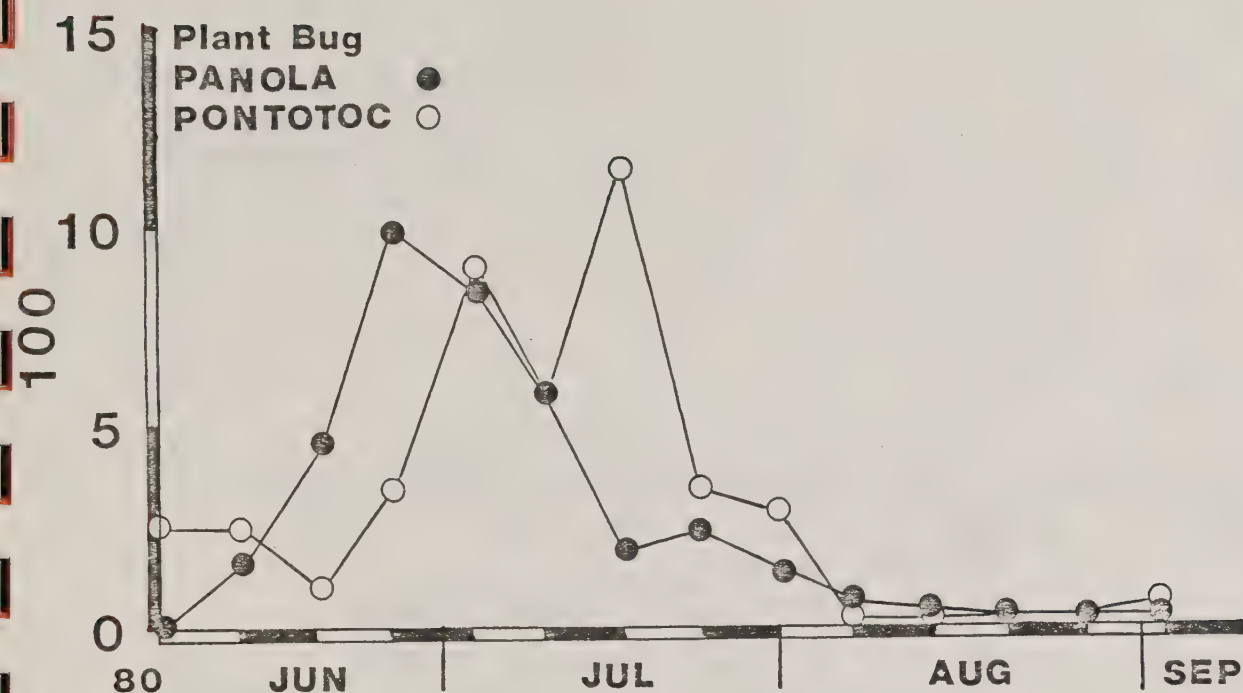


Fig. 5. Average seasonal per acre tarnished plant bug populations based on D-Vac[®] samples in Panola and Pontotoc Counties, 1980.

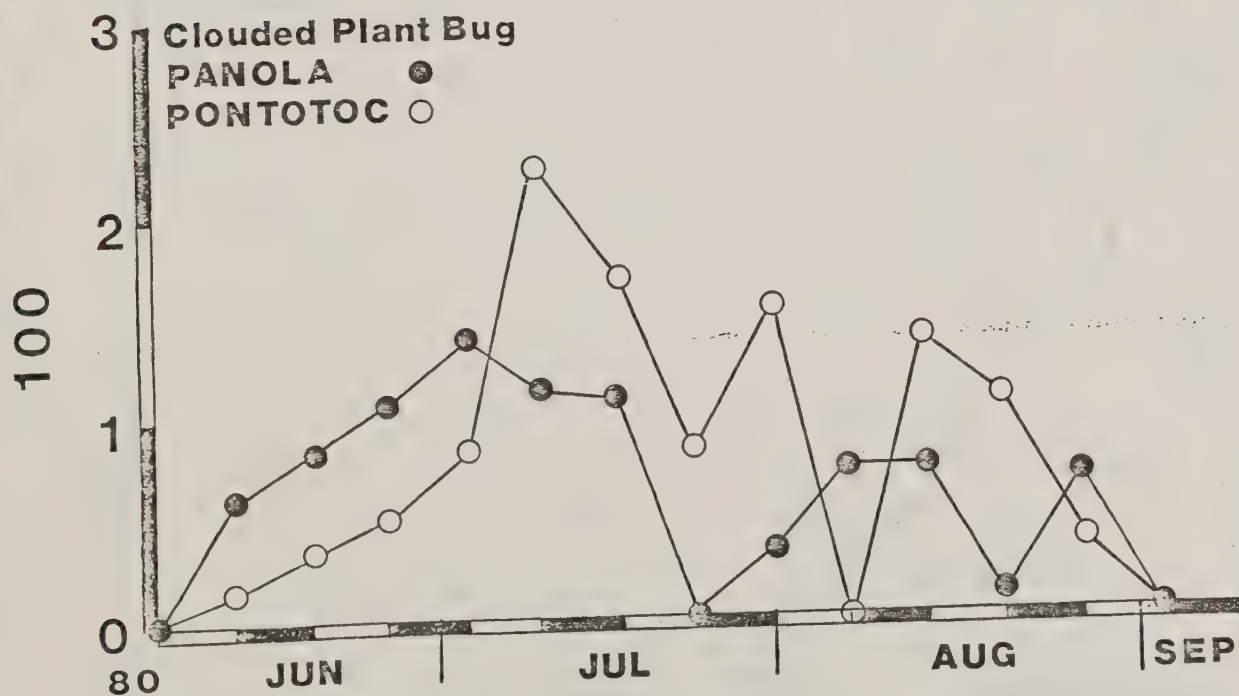


Fig. 6. Average seasonal per acre clouded plant bug populations based on D-Vac samples in Panola and Pontotoc Counties, 1980.

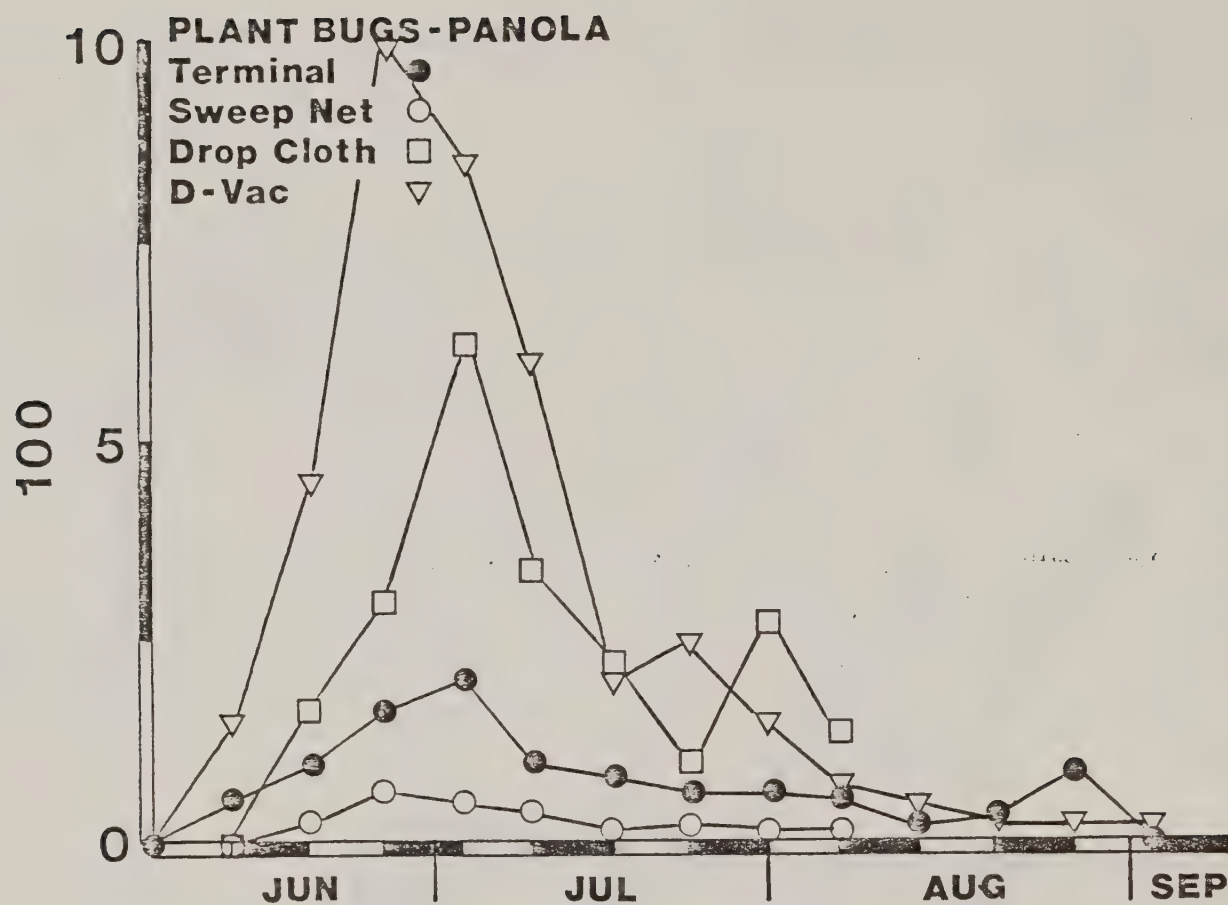


Fig. 7. Comparative plant bug populations obtained with four sampling methods in Panola County, 1980.

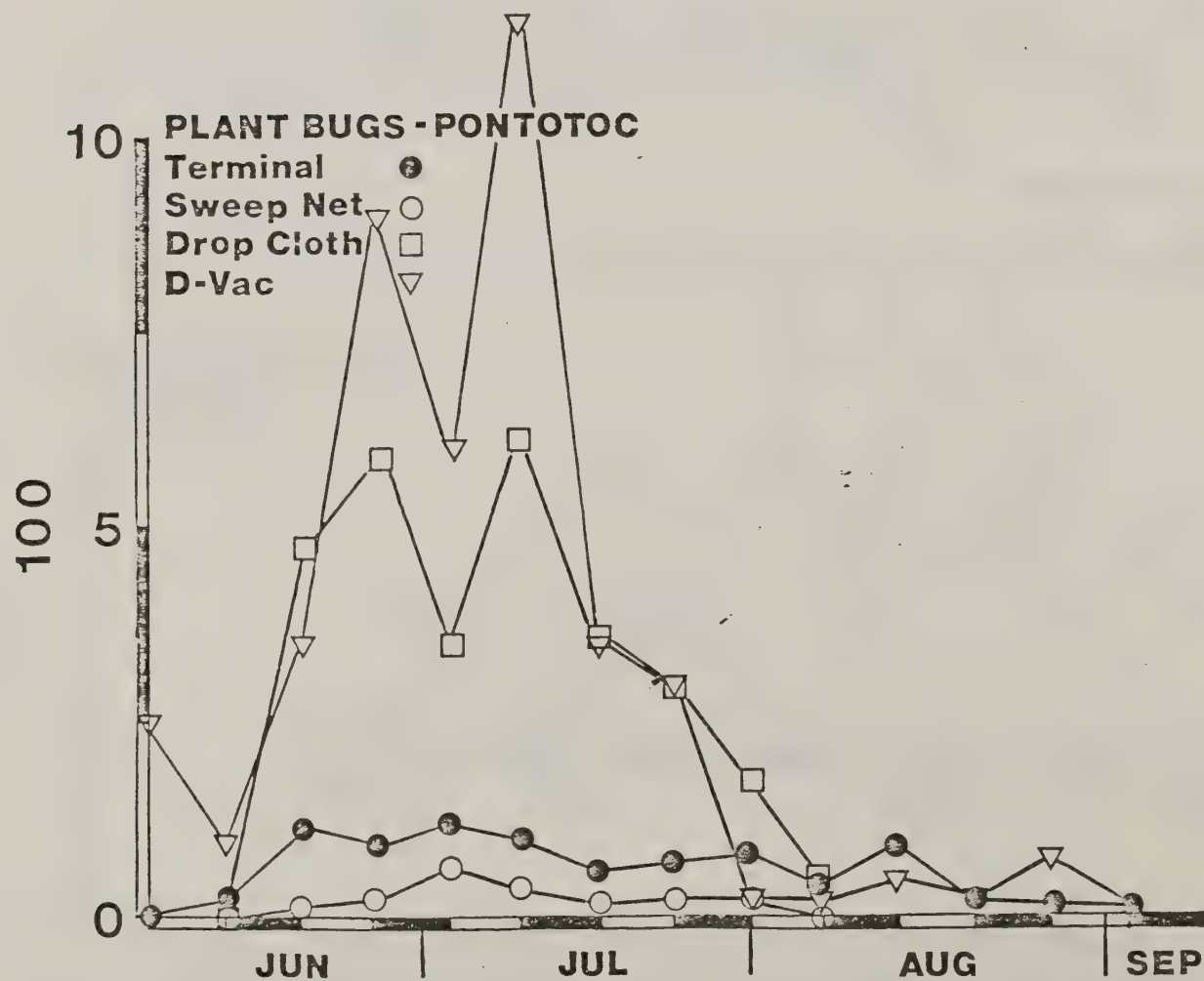


Fig. 8. Comparative plant bug populations obtained from four sampling methods in Pontotoc County, 1980.

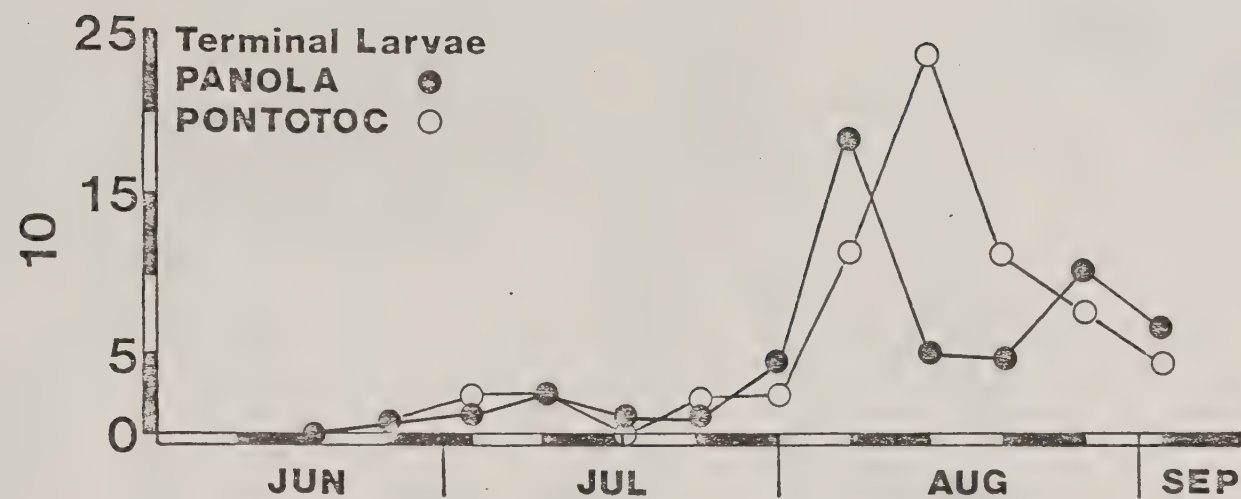


Fig. 9. Comparative seasonal per acre *Heliothis* spp. populations in terminal buds in monitored fields in Panola and Pontotoc Counties, Mississippi, 1980.

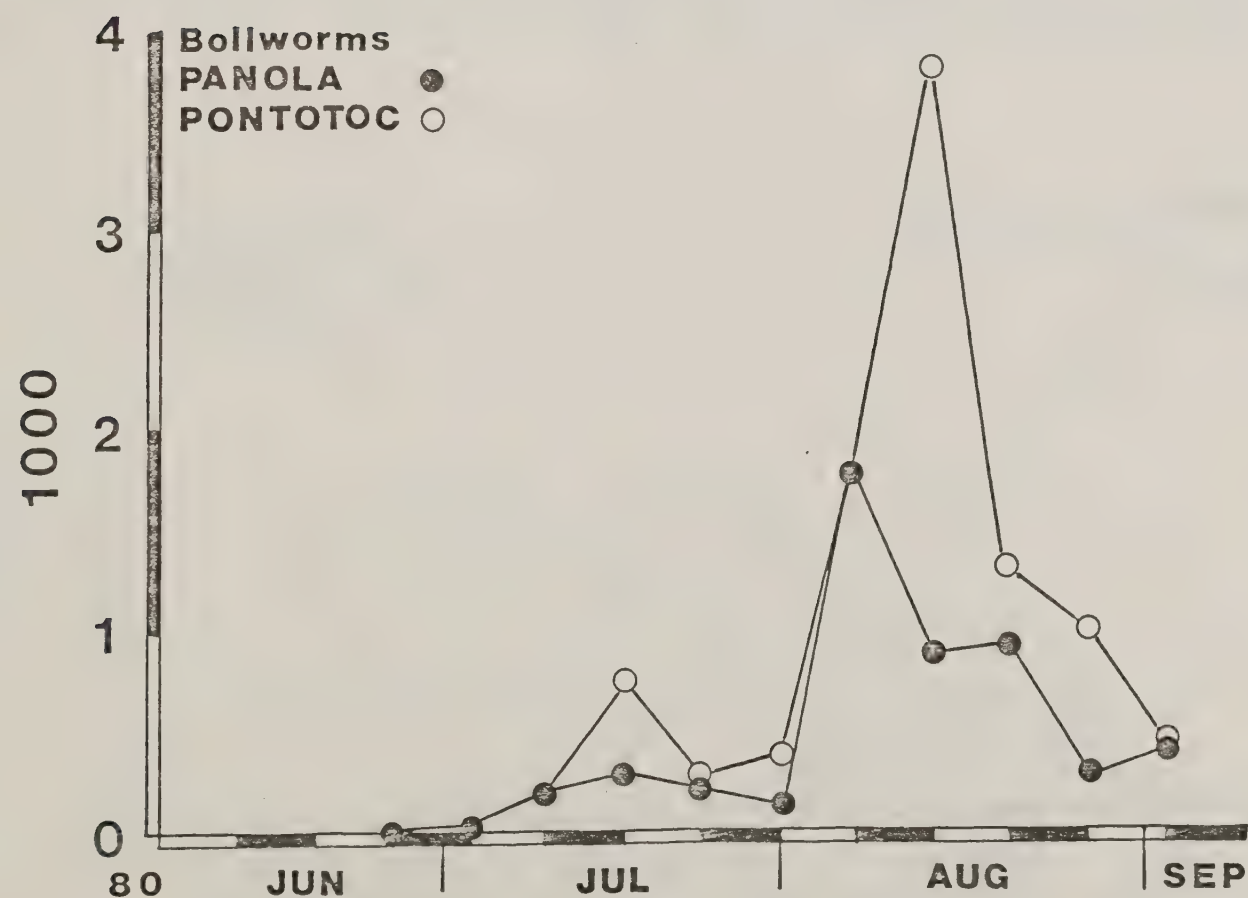


Fig. 10. Seasonal per acre total bollworm populations in Panola and Pontotoc Counties, 1980.

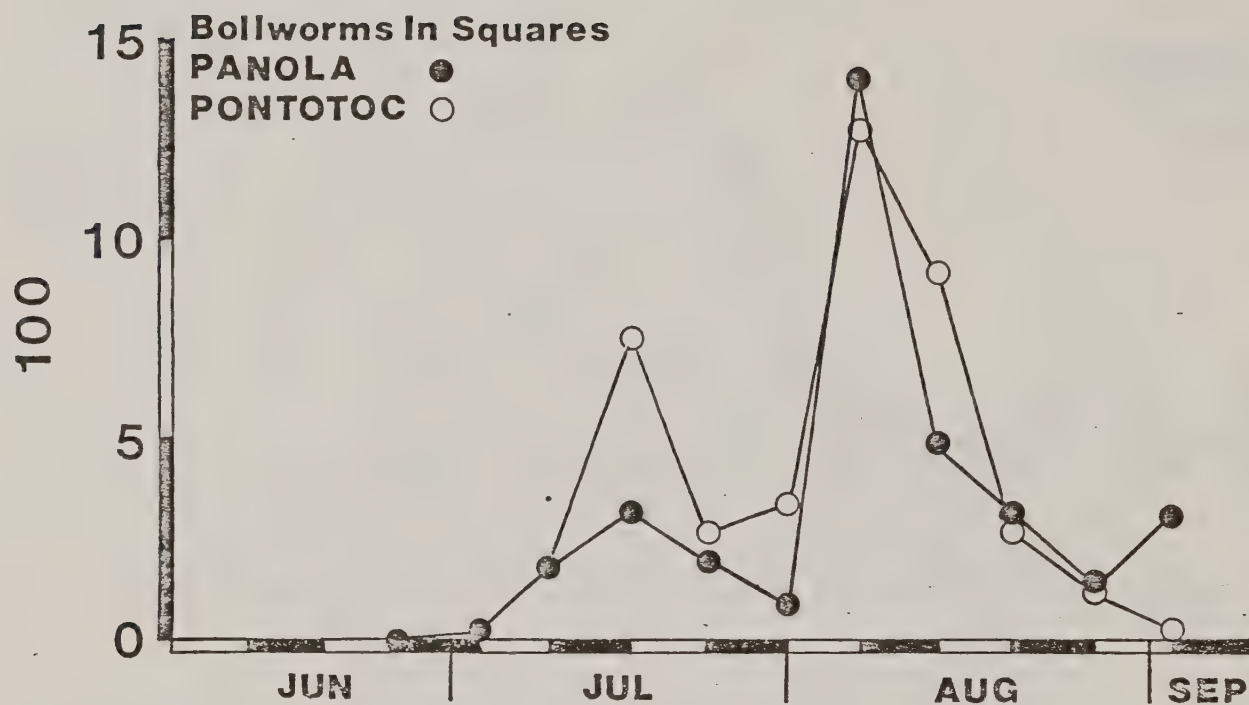


Fig. 11. Seasonal comparative per acre *Heliothis* spp. larval populations in squares Panola and Pontotoc Counties, Mississippi, 1980.

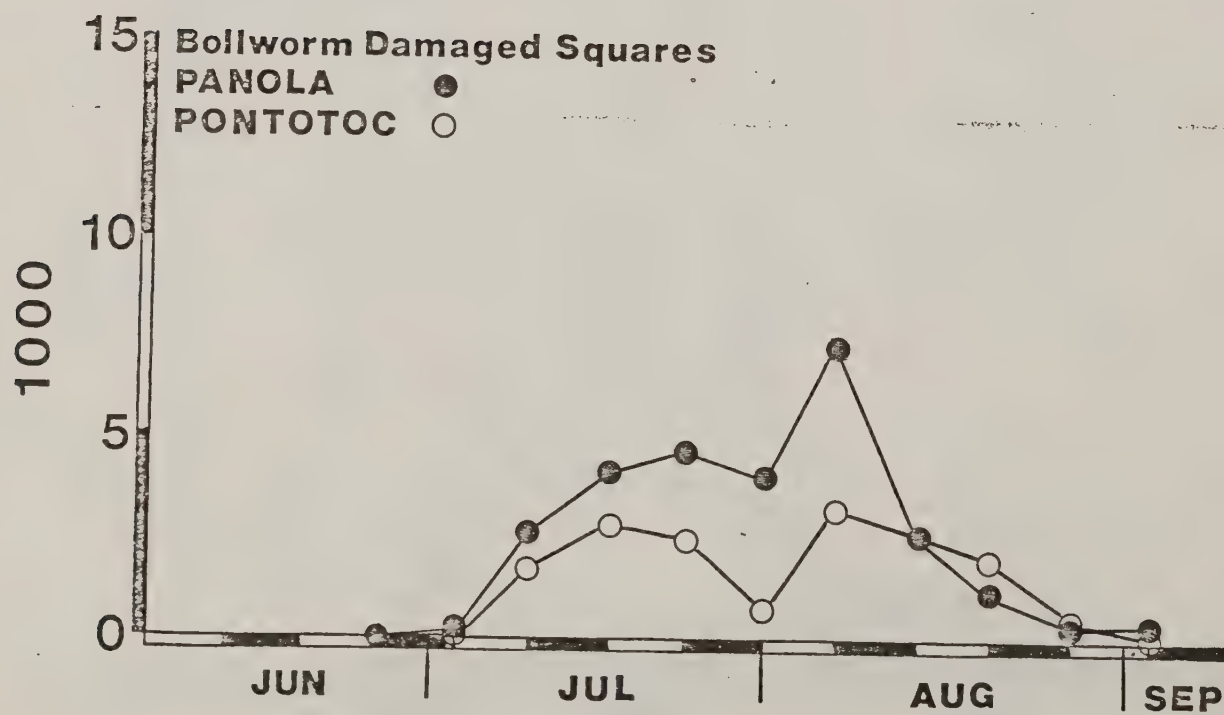


Fig. 12. Seasonal per acre bollworm damaged square in Panola and Pontotoc Counties, 1980.

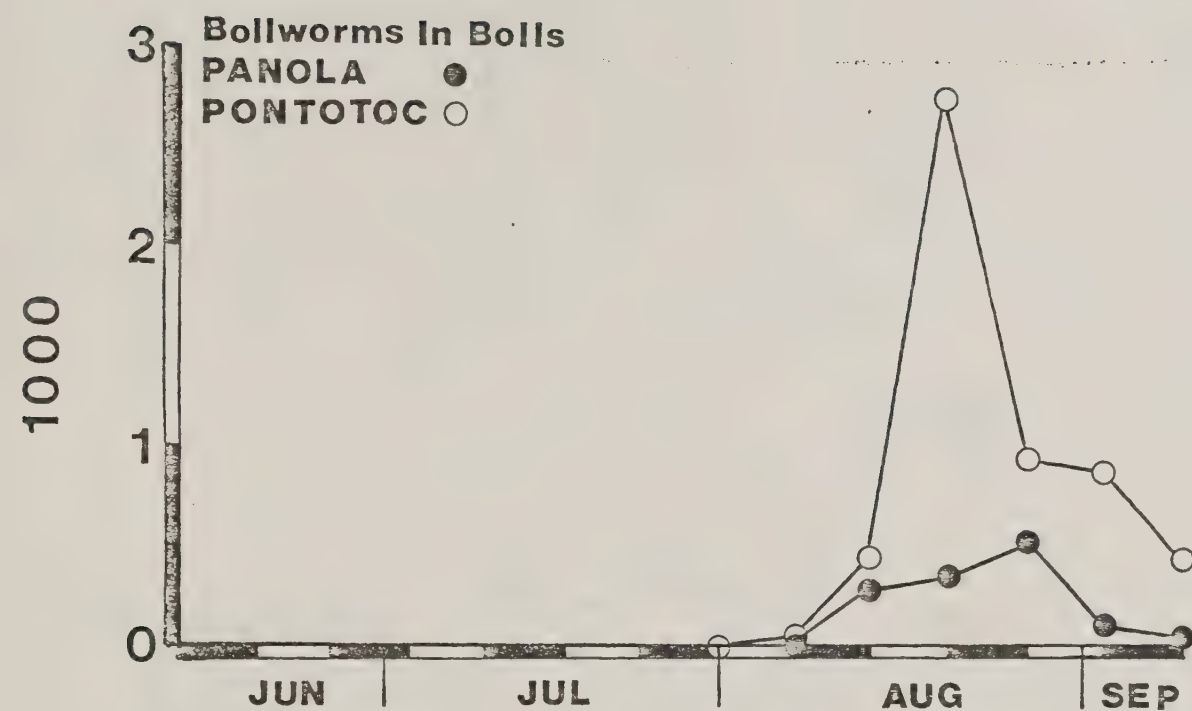


Fig. 13. Seasonal comparative per acre *Heliothis* spp. larval populations in bolls in Panola and Pontotoc Counties, Mississippi, 1980.

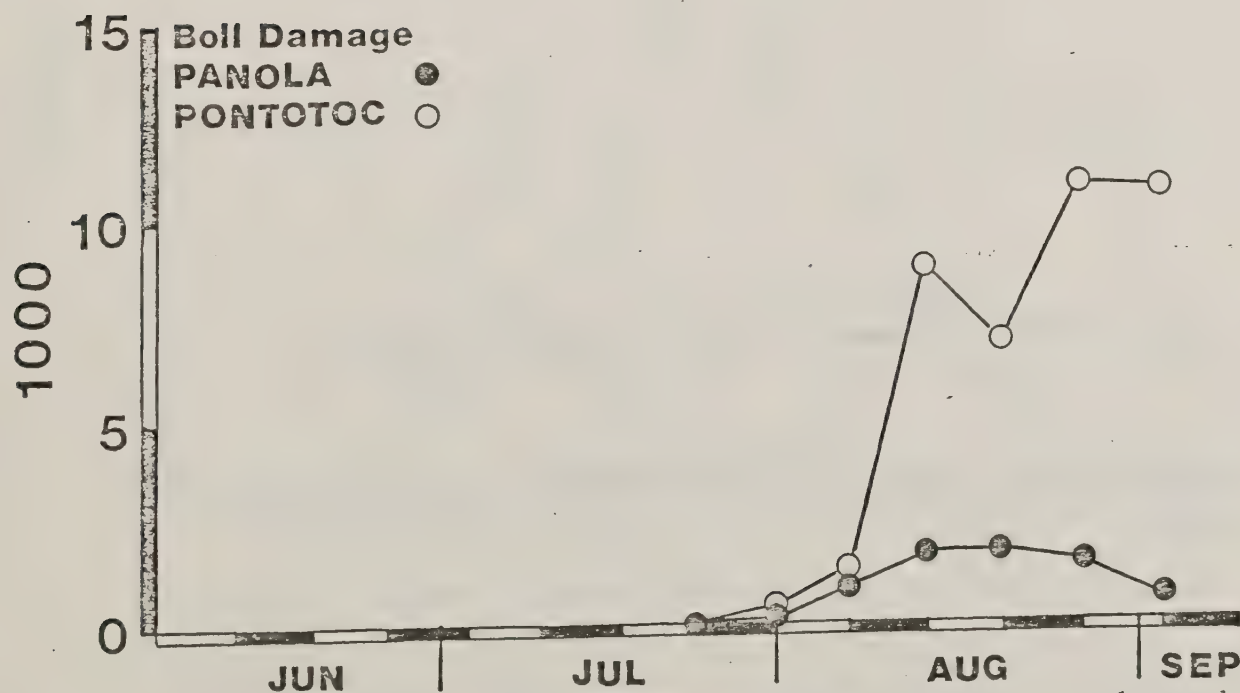


Fig. 14. Comparative seasonal average *Heliothis* spp. damaged bolls in Panola and Pontotoc Counties in 1980.

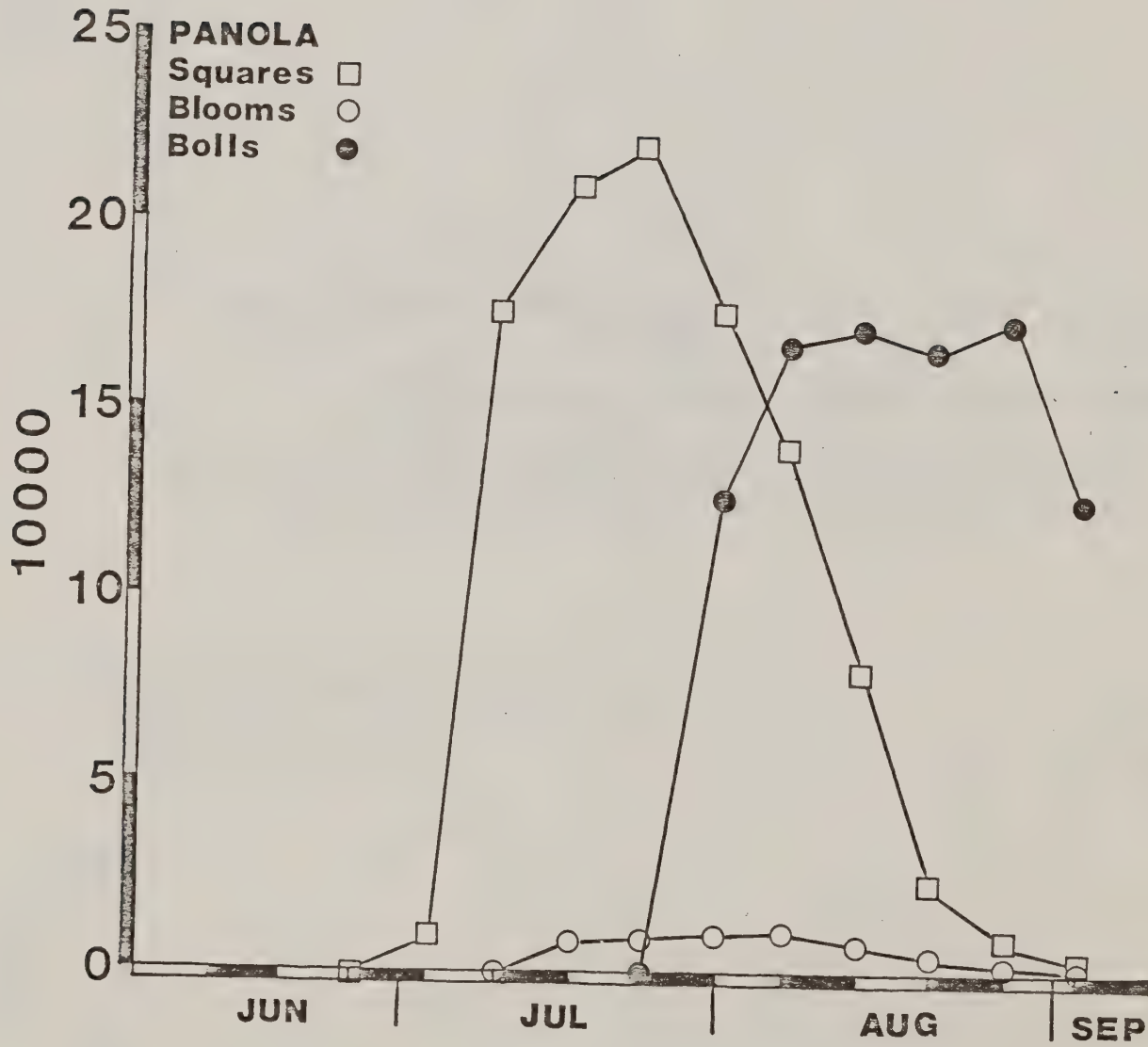


Fig. 15. Seasonal per acre productions of square, blooms and bolls in Panola County, Mississippi, 1980.

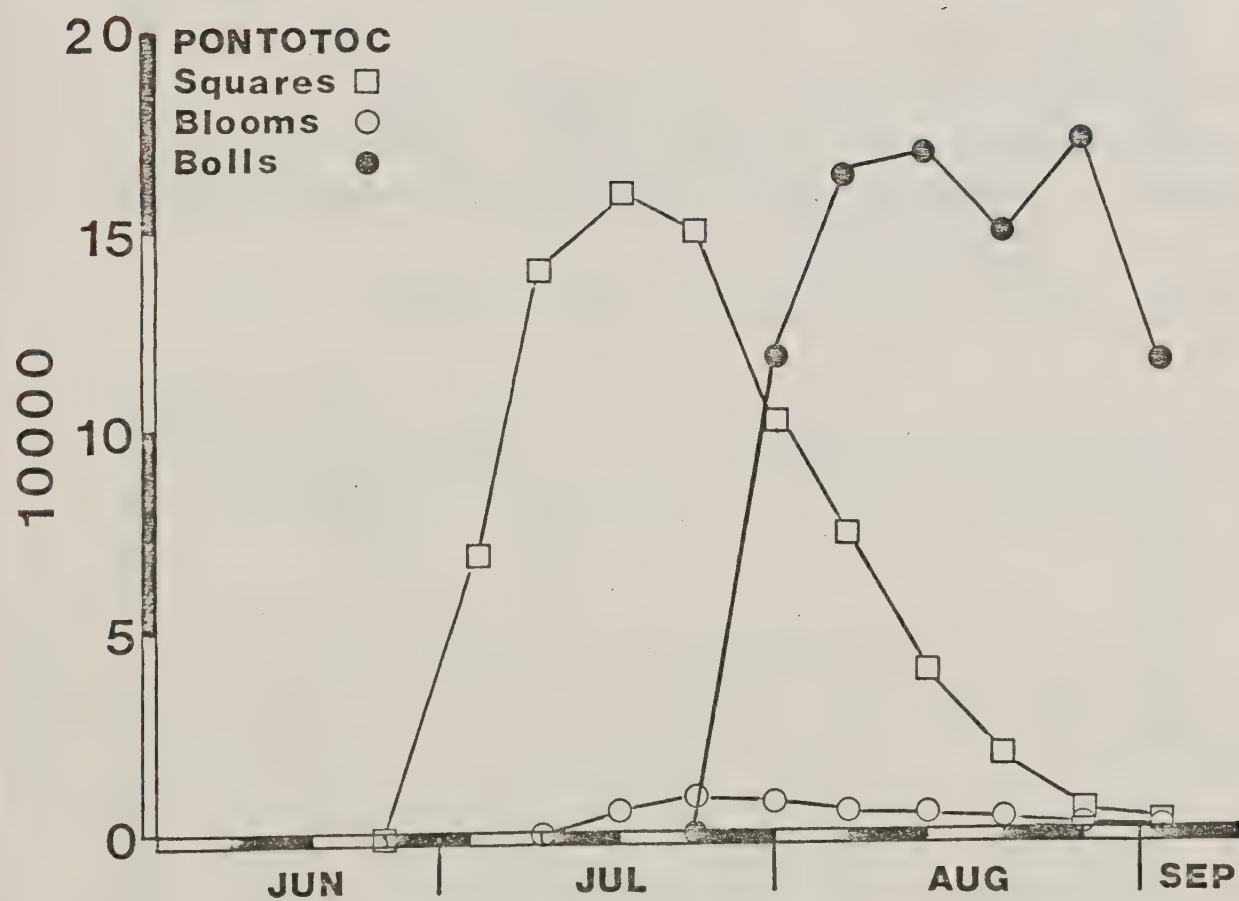


Fig. 16. Seasonal per acre production of squares, blooms and bolls in Pontotoc County in 1980.

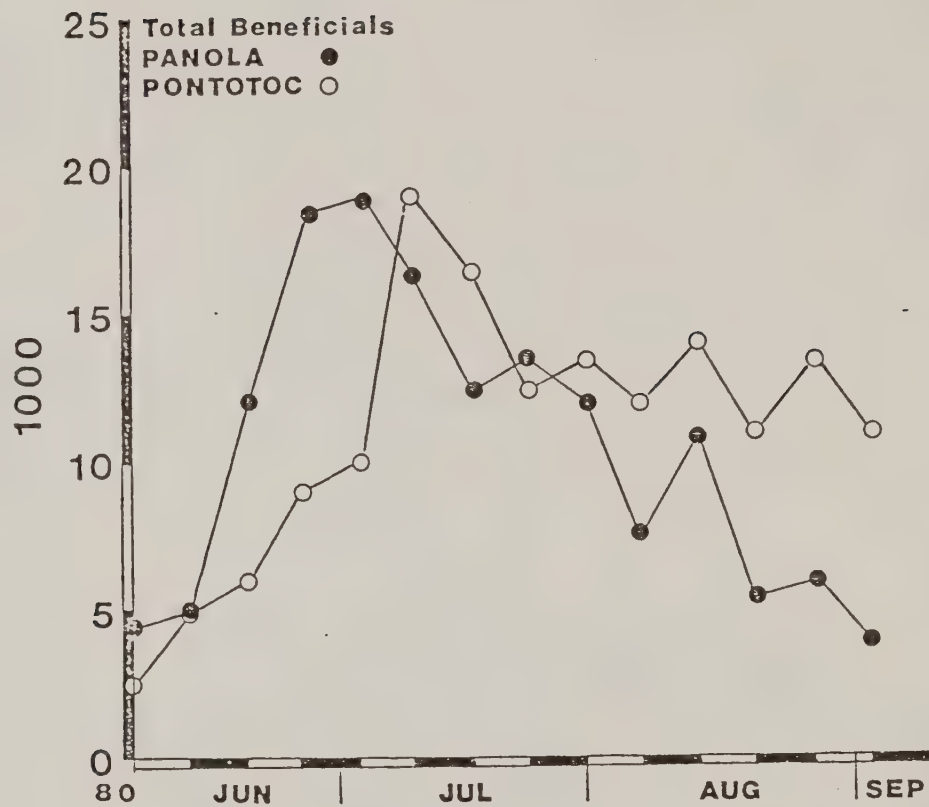


Fig. 17. Comparative seasonal per acre total beneficial insect populations based on D-Vac samples in Panola and Pontotoc Counties, 1980.

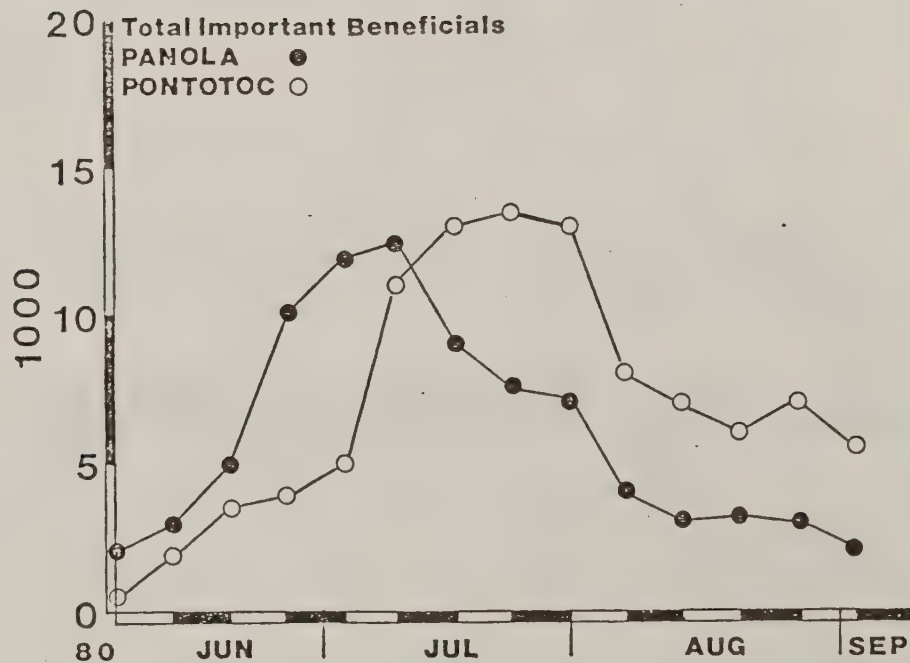


Fig. 18. Comparative seasonal per acre total important beneficial insect populations based on D-Vac samples in Panola and Pontotoc Counties, 1980.

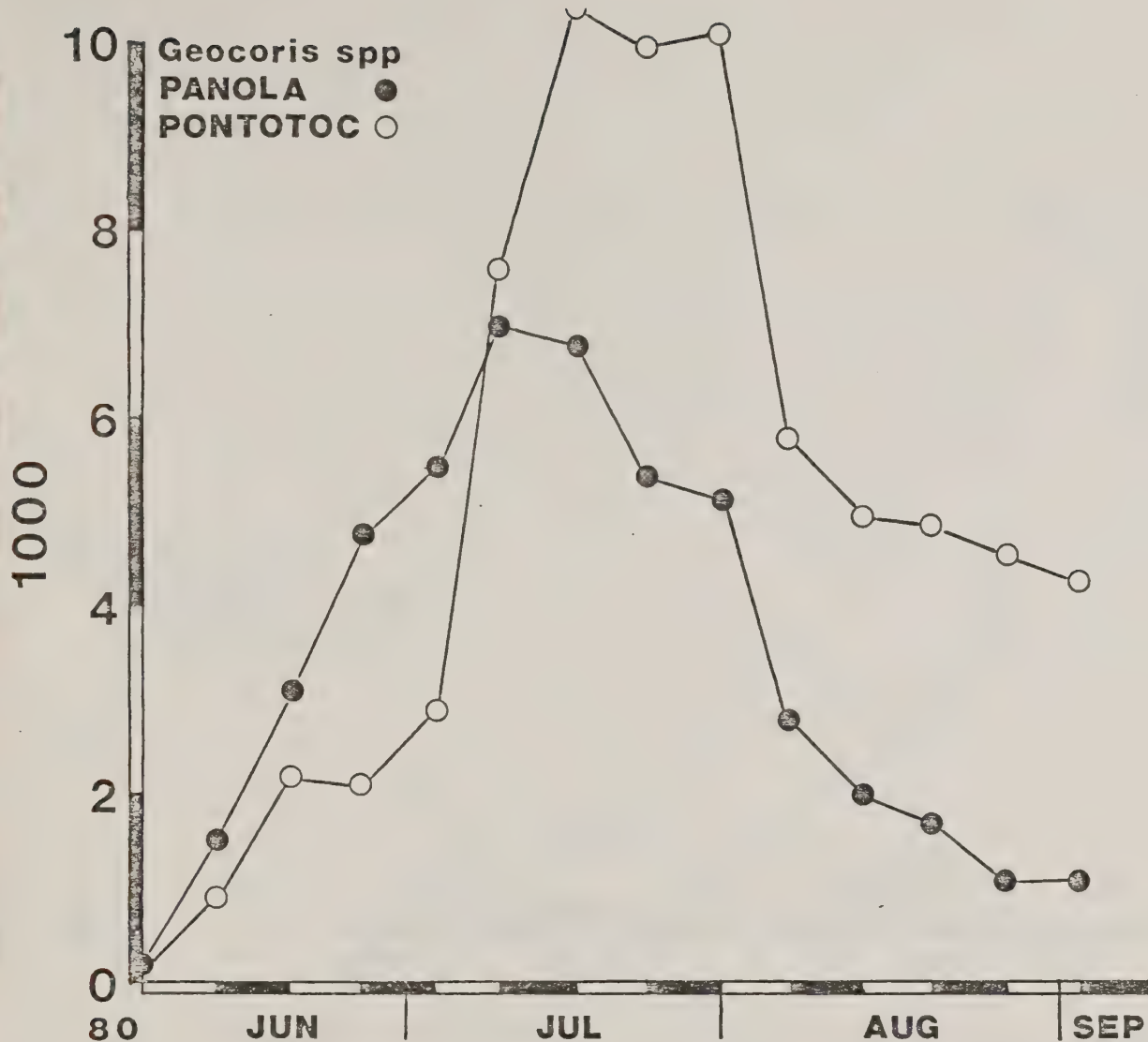


Fig. 19. Seasonal per acre populations of the big-eyed bug based on D-Vac samples in Panola and Pontotoc Counties, Mississippi, 1980.

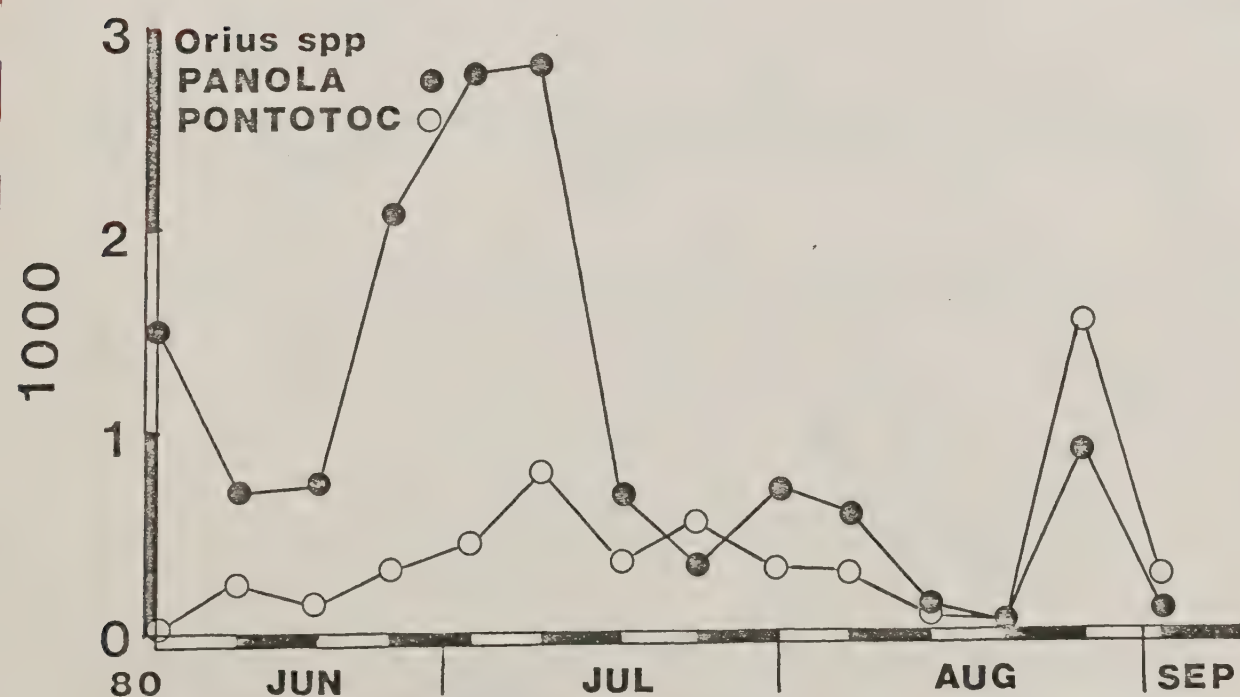


Fig. 20. Seasonal per acre populations of the flower bug based on D-Vac samples in Panola and Pontotoc Counties, Mississippi, 1980.

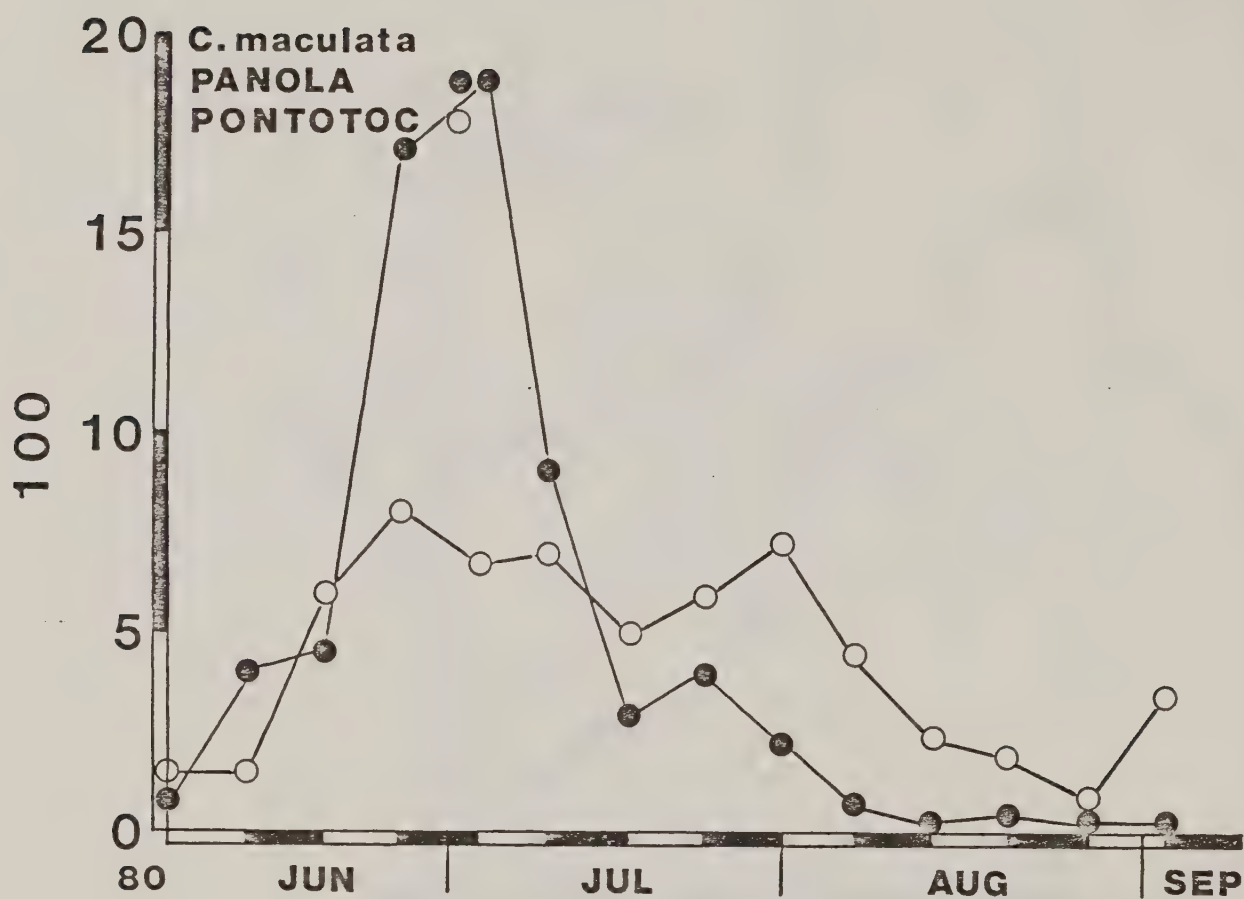


Fig. 21. Per acre spotted lady beetle populations based on D-Vac samples in Panola and Pontotoc Counties, 1980.

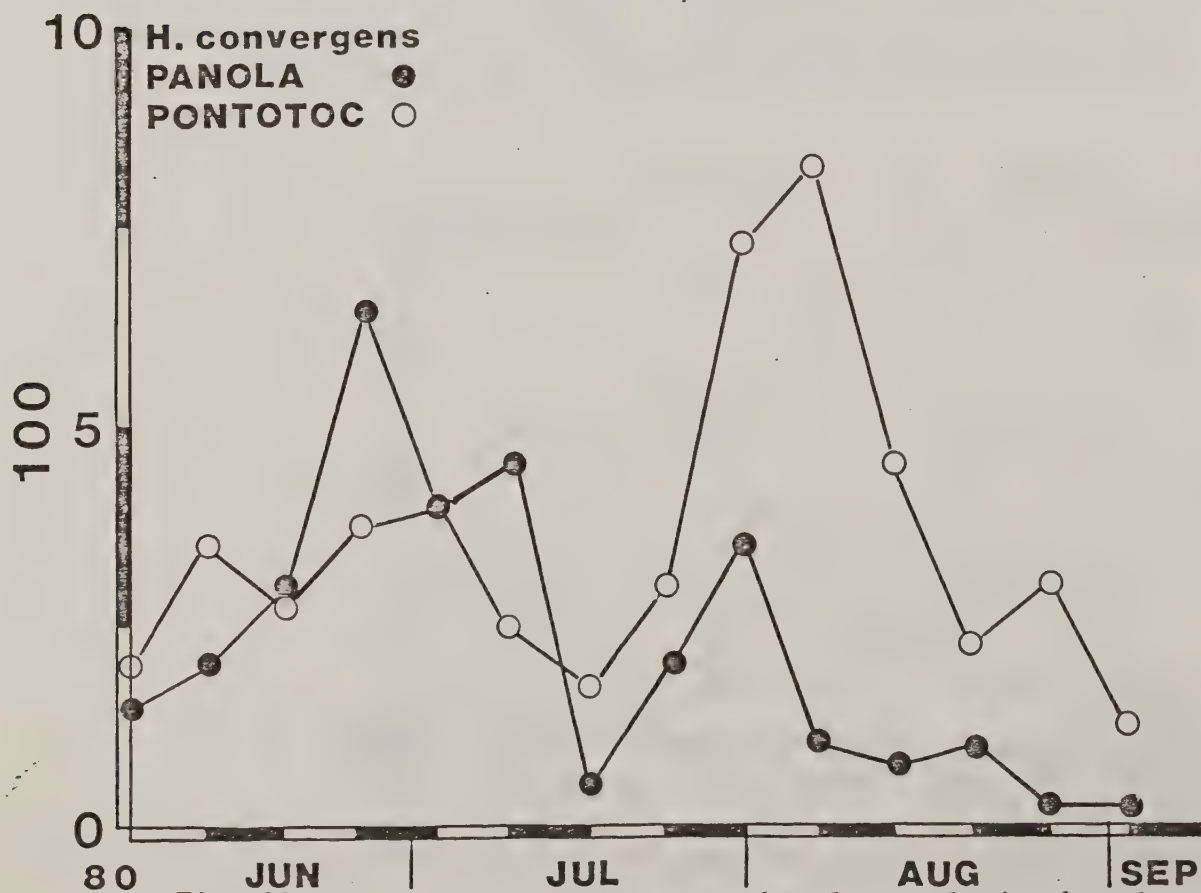


Fig. 22. Per acre convergent lady beetle population based on D-Vac samples in Panola and Pontotoc Counties, 1980.

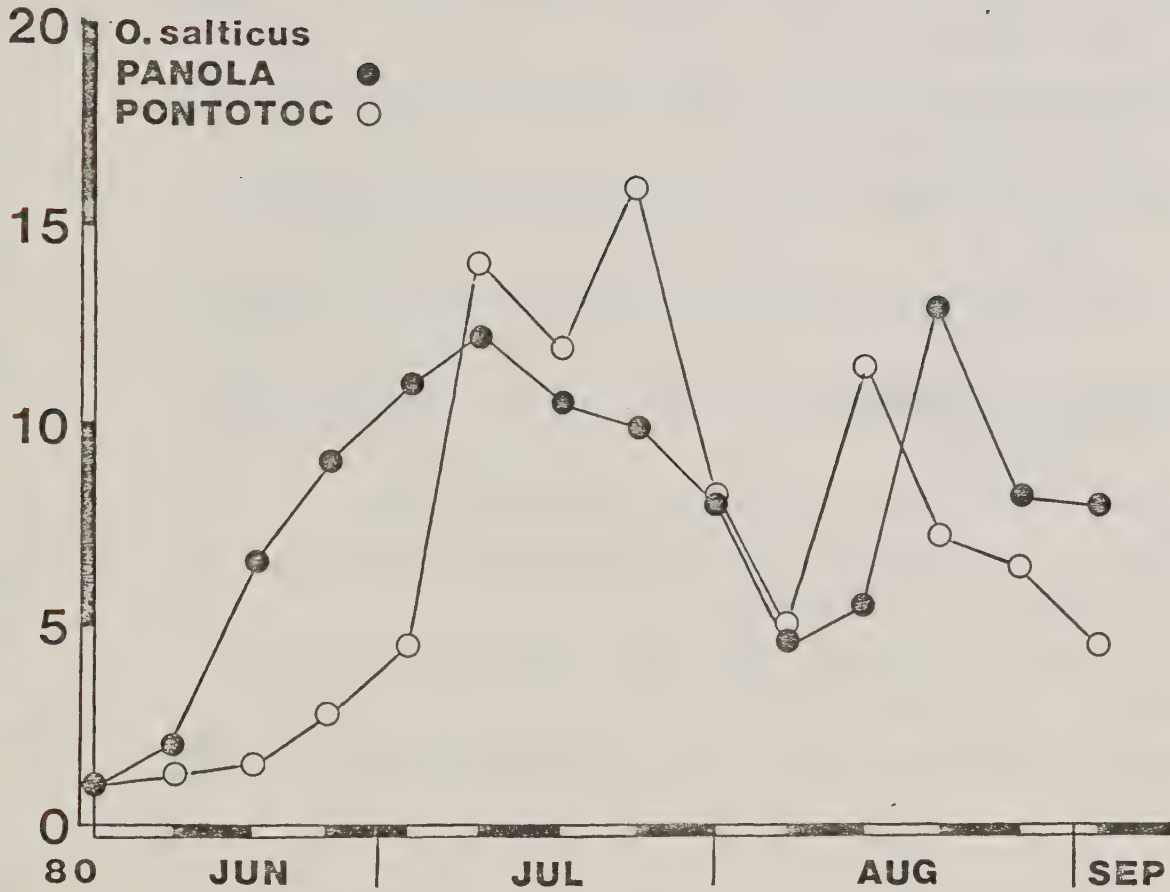


Fig. 23. Seasonal comparative hunting spider, *O. salticus*, populations based on D-Vac samples in Panola and Pontotoc Counties, 1980.

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